

Violence and Sociality in Human Evolution¹

by Bruce M. Knauft

Patterns of violence and sociality found among simple human societies are compared and contrasted with those documented among the four great-ape species and among more complex prestate human societies. An evolutionary scenario is developed by assessing comparative trends with respect to food/resource sharing, dominance structure, male competition for sexual access to females, violence and intergroup competition, and overall patterns of violence and sociality. Simple human societies contrast with both great-ape and middle-range human societies in exhibiting a relative absence of competitive male dominance hierarchies and of systematic violence between closed social groups, while being more egalitarian among adult males politically, sexually, and in terms of resource sharing. A U-shaped evolutionary trajectory of selected features of human violence is proposed, with the trough of the curve persisting throughout most of *Homo sapiens* evolution. Simple human societies constitute a major anomaly for models which propose evolutionary similarity between great-ape and prestate human patterns of violence and suggest a view of human evolution that takes seriously the group-selection potential of symbolic transmission. It is suggested that more consideration be given to cultural capacities in interaction with ecological constraints and biogenetic selection in studying the evolution of human sociality and violence.

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In simple human societies, lethal violence may be high in aggregate statistical terms, but the pervasive ethos is one of active cooperative affiliation among diverse groups of relatives and nonrelatives (Knauft 1987a). The cultural norms of sociality in these societies seem to be both strong and prone to lethal contravention within the local group. The violence that does occur has relatively little to do with territorial rights, property, ritual status, or male leadership concerns and is based more on consensually approved status leveling among men than on status elevation. Rather than being valued or associated with kin-group or ethnic oppositions, violence emerges sporadically among local cooperative groups, especially as a social-control mechanism or as an expression—commonly displaced—of male sexual frustration. Such incidents are relatively uncontrolled and likely to result in homicide.

This pattern of violence and sociality contrasts in very broad terms with that found in more complex prestate societies. In these "middle-range" societies, including complex hunter-gatherers and what used to be called "tribes" and "chiefdoms" (Price and Brown 1985, Feinman and Neitzel 1984, Upham 1990a, Fried 1975; cf. Service 1971, Sahlins 1968, Carneiro 1981), sedentism, property ownership, and male status differentiation are more developed, and conflict tends to arise from overt and chronic political status competition, both within and between groups, and from competition over access to resources. In contrast to that in simpler human groups, violence in middle-range societies tends to be valued as a dimension of masculinity, frequently takes the form of collective reciprocating conflict (i.e., warfare), and is often linked with fraternal interest groups, social boundedness, and ethnocentrism. In the evolution of *Homo sapiens sapiens*, it is likely, as Gellner (1989:521) suggests, that coercion and violence as systematic means of organizational constraint developed especially with the increasing socioeconomic complexity and potential for political hierarchy afforded by substantial stored food surplus and food production (see Testart 1982).

Given these trends, the causes of severe violence commonly adduced for middle-range societies—political status competition, resource or population pressure, territorial disputes, and the existence of fraternal interest groups—are less effective in explaining patterns of violence in simpler human societies (Knauft 1987a; contrast Otterbein 1968, Otterbein and Otterbein 1965, Thoden van Velzen and van Wetering 1960; cf. Ross 1985, 1986; Price 1984). At the same time, sociobiological explanations of violence emphasizing the importance of male sexual competition for reproductive success have difficulty explaining the extreme political and sexual egalitarianism among men in simple societies (see Leacock and Lee 1982; contrast Chagnon 1988; cf. Knauft 1987a). This raises an important larger question: what is the overall trajectory of violence and sociality in human evolution?

To begin answering this question, a broad comparison of great-ape and human societies is here conducted with

regard to food/resource sharing, dominance structure, male competition for sexual access to females, violence and intergroup competition, and overall patterns of violence and sociality. Theoretical assessments and elements of an evolutionary scenario are developed in the course of data presentation and analysis.

Qualitative contrasts between simple and more complex prestate human societies raise a host of definitional and methodological questions (Knauff 1990a; 1987a:478–79, 481–82; Woodburn 1980, 1982; Testart 1985; Feinman and Neitzel 1984). For present purposes, “simple human societies” are societies that lack recognizable leadership roles and status differentials among adult men. Egalitarianism tends to be pervasive in such societies. This pattern is characteristic of many nomadic foraging societies and a very few forager-horticulturalists. In contrast, “complex” hunter-gatherer societies, particularly those with sedentary residence and/or rich resources, may exhibit elaborate economic and political status-differentiation systems, including rank distinctions and chiefs (e.g., Price and Brown 1985; Carneiro 1981:49). In evolutionary terms, complex hunter-gatherer societies were most common after 12,500 B.P., usually transitional between simple hunter-gathering and agricultural systems, and of relatively short prehistoric duration, usually no more than two to three millennia (Henry 1985:366).² A very few migratory foragers, particularly Australian Aboriginal societies, recognized political inequality among men on the basis of ritual grade and age distinctions associated, as Woodburn (1980) has suggested, with distinctive patterns of delayed-return reciprocity.³

As Netting (1990) has recently noted, the development of nonegalitarian political organization in cultural evolution is not a determinate function of ecological and demographic factors. Correspondingly, the core dimen-

sions of “simple societies” are sociopolitical and not completely reducible to factors of subsistence or population density (Layton 1986, Ingold 1987, Woodburn 1980). It is, however, worthwhile to note ecological, economic, and demographic characteristics that are seldom found in association with simple societies as here defined: population densities greater than 2–3 per km², year-round residence at a single site, pronounced food storage (Testart 1982), substantial delayed-return reciprocity systems (Woodburn 1980, 1982, 1988), substantial material wealth, and intensive reliance upon domesticated animals or fishing.⁴

These exclusions focus consideration on the ethnographically documented societies that are more likely to be representative of social dynamics among humans in the period before complex and semisedentary hunter-gatherer societies began to become prominent. These are smaller and more decentralized human groups than have been considered in most previous comparative assessments of prestate or hunter-gatherer violence and sociality (e.g., Ember 1978, Ferguson 1984a, Otterbein 1968, Otterbein and Otterbein 1965, Haas 1990; see also Manson and Wrangham 1991; cf. Wrangham 1987).

The use of known ethnographic patterns to infer evolutionary trajectories is of course fraught with problems (see critiques by Schrire 1984; Headland and Reid 1989; Leacock and Lee 1982: pts. 2 and 3; Wobst 1978; Lewin 1988; Foley 1988:220; Myers 1988), and the number of well-documented simple societies is relatively small. If carefully undertaken, however, such an enterprise can be a useful point of departure for further, more empirically sophisticated comparative research. Indeed, careful articulation of ethnographic with prehistoric research is indispensable to the development of a penetrating view of human sociocultural development (e.g., O’Connell, Hawkes, and Blurton Jones 1988a, b; see Foley and Lee 1989). Ethnographically studied simple societies are not here equated with prehistoric ones or great apes with our hominoid ancestors. Rather, it is suggested that the striking differences among these more contemporary congeries of social systems may have analogies in earlier phases of human evolution.

It would be a mistake to write off our best data about simple societies as a function of Western state encroachment and projection (see Solway and Lee 1990, Woodburn 1988; contrast Wilmsen 1989). If anything, the historical changes that have impacted hunter-gatherers in this century have served to reduce rather than artifi-

2. Complex hunter-gatherer adaptations were present in selected areas of Europe during the Upper Paleolithic (e.g., Mellars 1985) and common during the Mesolithic (e.g., Zvelebil 1986; Bailey 1983:chaps. 8 and 9; Price and Brown 1985). Evidence of such complexity in the Middle East dates to 14,000–10,000 B.P. in the Levant Natufian (Henry 1985), and there is an exceptional case from the central Russian Plain as early as 26,000 B.P. (Soffer 1985, McBurney 1976). Some complex hunter-gatherer formations survived and/or developed during the contemporary historical period, among them Northwest Coast fishing adaptations and Great Plains domesticated-animal adaptations (the latter not involving sedentism but potentiating competitive property rights and material status differentiation).

3. Pronounced adult male status differentiation, polygyny, a greater incidence of domestic and intergroup fighting, and a more developed sense of ethnic territorial identity (e.g., based on totemic/ritual identification) were as a broad cluster incipient among Australian Aboriginal cultures but rare among nonintensive hunter-gatherers elsewhere. In the Australian context, raiding and warfare were most developed among the complex hunter-gatherers who inhabited resource-rich coastal areas (e.g., in Arnhem Land [e.g., Warner 1930, 1969 (1937); Hiatt 1965; Berndt 1965] and among the Tiwi [Hart and Pilling 1960]). Reciprocal raiding and warfare were much less developed in arid central Australia (e.g., among the Walbiri [Meggitt 1962] and the Aranda [Strehlow 1947, 1965]) and extremely arid western Australia (e.g., among the Pintupi [Myers 1986; cf. Hamilton 1982]).

4. In the Standard Cross-Cultural Sample, societies with significant evidence of class stratification or wealth distinctions as tabulated by Murdock (1981:101–2, col. 67) cannot be considered “simple.” Also excluded are intense riverine/coastal adaptations, which occurred relatively late in human evolutionary history and frequently supported extensive sedentary populations, food storage, and/or sociopolitical hierarchies. High hunter-gatherer dependence on fishing is correlated with such class stratification ($\chi^2 = 8.226$, d.f. = 1, $p < .01$). As might have been expected from Ross’s (1985:554; 1986) finding that socioeconomic complexity and external warfare covary, there is also a positive (though not statistically significant) correlation between warfare frequency and fishing dependence among hunter-gatherers (cf. Ember 1978).

cially increase the distinctiveness of these societies. Leadership and residential centralization, individualistic property ownership, and status competition tend to increase as foragers are impacted by the trade networks and political status differentiation of horticultural and state societies (e.g., Cashdan 1980, 1983, 1986; Hitchcock 1987; Kent 1989; Knauf 1990a; cf. the classic analysis by Murphy and Steward 1955). At the same time, decentralized leadership, diffuse and flexible interband alliance, generalized reciprocity, and adult male status equality tend on the whole to be more common in more autonomous and more decentralized foragers (e.g., Mbuti net-hunters versus Mbuti archers, !Kung San versus Basarwa [Cashdan 1980, 1986]). In terms of developmental trajectories, then, the distinctive features of simple societies are unlikely to have been a function of contemporary developments (see Woodburn 1988).

Food/Resource Sharing

One key common feature in many scenarios of human evolution is the regular sharing of food and other resources among adults and by adults with children (e.g., Tooby and DeVore 1987; Isaac 1978; Lovejoy 1981, 1982; Foley 1989; Foley and Lee 1989:905; Tanner 1987; cf. Hill 1982, Foley 1982). Such social investment of resources is consistent with highly altricial and late-maturing offspring and a distinctive sexual division of labor.⁵ As described by Foley (1984:99–103; 1987; 1989; Foley and Lee 1989) and Kurland and Beckerman (1985), the conditions faced by hominids in savanna environments included patchy resource distribution and the need for complex and flexible foraging strategies, a broad dietary niche, high mobility, and protection against predators. Divergent interpretations proliferate concerning subsistence patterns and social organization in human evolution, for example, concerning the importance of hunting and carnivory versus scavenging (e.g., Isaac 1984; Potts 1987, 1988; Shipman 1983, 1986; Tanner 1987; Binford 1981, 1983, 1989). Hyperscepticism aside, it remains quite likely, at least for *Homo*, that cooperative strategies including significant reliance on hunting were pronounced over a significant portion of human evolutionary history (e.g., Hill 1982; O'Connell, Hawkes, and Blurton Jones 1988a, b; Foley 1982; Nitecki and Nitecki 1987). Isaac's (1978) scenario of band dispersal and reaggregation for protection and the sharing of food and information, while unlikely to be applicable to all hominids, is likely to remain important for

an evolutionary understanding of *H. sapiens* and possibly *Homo* in general.

In all ethnographically known simple societies, cooperative sharing of provisions is extended to mates, offspring, and many others within the band. Communal sharing of food, especially of prized food items such as meat, is highly developed and indeed crucial, serving, among other things, as a collective means of ecological risk reduction (Cashdan 1980, 1985; cf. 1990; Smith 1988). This sharing takes place well outside the range of immediate kin, viz., among the diverse array of kin and nonkin who constitute the typical residence group of 25+ persons.⁶ Archeological evidence suggests that widespread networks facilitating diffuse access to and transfer of resources and information have been pronounced at least since the Upper Paleolithic (Gamble 1982; 1983; 1986:322–42; Whallon 1989).

Ethnographers of simple societies have consistently emphasized the social and cultural as well as ecological importance of sharing; diffuse distribution of major food items (and other articles of value) is a prominent if not preeminent cultural value (e.g., [!Kung] Marshall 1979, Wiessner 1982; [Mbuti] Turnbull 1961, 1965a, b; [Mbuti archers/spearmen] Harako 1976:76–79; [Inuit] Balikci 1970:chaps. 5 and 6; Guemple 1972; Damas 1984; [Guayaki/Ache] Clastres 1972, Kaplan and Hill 1985a, Kaplan et al. 1984). The functional significance of meat sharing is obvious: game is seldom a dependable single-family resource and yet is in some form a crucial dietary component in virtually all simple societies (see Eaton and Konner 1985, Hill 1982). Given that game is often procured in large units but only sporadically obtained by a given hunter, sharing effectively increases average daily food consumption (see Kaplan and Hill 1985a). Marshall (1979:363, 357) writes, "The !Kung are quite conscious of the value of meat-sharing and they talk about it, especially about the benefit of the mutual obligation it entails. The idea of sharing is deeply implanted and very successfully imposes its restraints. . . . The idea of eating alone is shocking to the !Kung. It makes them shriek with an uneasy laughter. Lions could do that, they say, not men." Testart (1985, 1987) has documented in detail the variations of food sharing among hunter-gatherers worldwide. Food sharing in simple societies is both an index of cooperation and a key symbol of what it is to be human. More generally, an ethic of communalism and equal access to resource production is highly developed (e.g., Ingold 1988:277–85; Lee 1988, 1990; Leacock and Lee 1982).

A more complex and in some ways different ethic emerges increasingly in middle-range human societies—food-storing and sedentary foragers, horticultur-

5. Frequent separation of males from their mates—entailed by dispersed food resources and the sexual division of labor—offers the opportunity for sexual cheating and presents a threat to paternity certainty. Under such conditions, a man risks "wasting" his parental investment on someone else's offspring even if he limits his provisioning to his mate's children. How intensive male provisioning could have evolved under conditions of sex-biased diurnal dispersal is thus a key question for many models of hominid behavior.

6. The early generalizations of Lee and DeVore (1984 [1968]) concerning residential flexibility and bilateral group cooperation among hunter-gatherers remain more applicable to simple societies than to the much broader sample of all hunter-gatherers (contrast Ember 1978); see, for example, [Mbuti] Turnbull (1965a, b, 1984), [Hadza] Woodburn (1972, 1984), [!Kung] Lee (1979b:chaps. 5 and 6), and [Eskimo] Balikci (1970:chaps. 3–6), Damas (1984), and Guemple (1972).

alists, prestate ranked societies, and chiefdoms. Though the range of variation is enormous, group size and population density tend to increase, and the individual's social universe becomes more differentiated (e.g., Johnson and Earle 1987:chaps. 5–13; Upham 1990b; Carneiro 1981; Testart 1982; Haas 1990). There is increasing concentration and investment of labor in long-term land and domesticated-animal resources, residential structures, and material artifacts. Correspondingly, there is increased benefit in forcefully defending domesticated resources and property—and in forcefully obtaining them from other groups—while the costs of defending them decrease. Extradomestic spheres of resource allocation become much more clearly defined. Plog (1990:193) points to “the development of a more restricted form of sharing, producing a smaller, more formalized social group composed of a limited number of households.” As Sahlins (1972) might put it, spheres of domestic generalized exchange and reciprocity are increasingly circumscribed and complemented by those of balanced and negative reciprocity between larger and opposed social units. Even the giving of large gifts and the establishment of alliances (Braun and Plog 1982) commonly take on an aura of political competition, if not outright aggression (Mauss 1970). Moreover, reciprocation of non-giving and antagonism becomes institutionalized among larger and better-defined groups of people. In short, clan and ethnic self-interest, competition, and interrelationship all become elaborated and developed, creating “increased potential for social conflict” and leading to “the evolution of a group ideology consistent with increased territoriality” (Plog 1990:193).

This is not to neglect the importance of intergroup exchange and alliance in small-scale sedentary societies (Braun and Plog 1982), nor is it to suggest that personal or group self-interest, possessiveness, or dispute is absent in simpler ones. In simple societies, however, the development of exclusive social identity and ethnocentrism tend to be opposed rather than cultivated and reinforced by deep-seated cultural norms and values. Norms of generalized and diffuse reciprocity are culturally and behaviorally foregrounded. This cultural emphasis is particularly viable for demographic and ecological reasons, since awareness of and confrontation with persons beyond the sphere of social cooperation are limited. In complex hunter-gatherers and small-scale sedentary societies, in contrast, negative reciprocity and violence tend to be valued as an important dimension of intergroup relationships.

Resource sharing in simple societies also contrasts in significant ways with the patterns found among our closest nonhuman relatives, the great apes (Pongidae)—chimpanzee, bonobo or pygmy chimpanzee, gorilla, and orangutan. The main sharable material resource among these nonhuman primates is food. Foliage and fruit are infrequently shared, except by mothers with their infants. Gorillas eat predominantly foliage (86%) and consume virtually no prey (Jolly 1985:47). Even gorilla infants have never been seen being given solid food by their mothers (Fossey 1979:167). Orangutan resource

sharing is also minimal (cf. Edwards and Snowdon 1980). Large ground-foraging orangutan males have on rare occasions been known to carry termite-infested logs into trees to share with female consorts (Jolly 1985:450). There is apparently only one report of orangutan meat eating, and this was carried out in a strikingly individualistic manner (Sugardjito and Nurhuda 1981).⁷

Common chimpanzees share vegetable resources and fruit more actively than orangutans and gorillas, but the vast majority of this sharing is between mother and infant (Hiraiwa-Hasegawa 1990, Nishida 1970, McGrew 1979b). Chimpanzees are distinctive among apes for their hunting; an estimated 10% of the time spent feeding is devoted to mammalian predation (Teleki 1981:327), which is often cooperative among several individuals, especially males (Goodall 1968, 1971, 1986:chap. 11; see also Boesch and Boesch 1989). Meat consumption among Gombe chimpanzees is estimated to average 27 g per individual per day, this being about one-tenth the per capita meat intake of !Kung San (Teleki 1981:327). The degree to which chimpanzees willingly share meat with each other has been a matter of some contention (Teleki 1973; McGrew 1979b:453–57; Wrangham 1975). On balance, however, there is distinct competition and possessiveness in meat “sharing,” as is illustrated in Goodall’s (1986:299–300) compendium volume on Gombe chimpanzees:

Meat is a highly coveted food and often there is intense aggressive competition around a kill. This aggression comprises (a) attacks on possessors of meat by those who have none, (b) attacks or, more usually, displays or threats by possessors toward the individuals trying to share their prey, (c) attacks or threats directed by those who have not managed to acquire portions toward lower-ranking individuals who are also trying to get some meat. Wrangham (1975) . . . found that of the twenty attacks made on individuals in possession of meat, the aggressor was successful only three times. . . . As Wrangham has pointed out, an individual in possession of meat is usually well able to defend it by crouching over it and protecting it with arms and body (much as a mother protects her infant when under attack). Moreover, the possessor is usually highly motivated to retain his prize. Even a low-ranking male may hold onto his prey in the face of intense aggression.

Chimpanzees who successfully hunt game alone also consume it alone unless discovered. Further, “an adolescent or low-ranking captor, or a female, is likely to lose possession of the carcass within moments of capture” (Goodall 1986:299).

Nonetheless, as McGrew (1979a) and de Waal (1989a) have suggested, there are some ways in which chimpan-

7. As Jolly (1985:62) describes the incident, “A female [orangutan] completely consumed the carcass of an infant gibbon, taking 137 minutes to do so. (She may have found the gibbon dead, because there was no blood.) An adult male she was consorting with stared at her fixedly for the first hour, but she did not share with him—an index of the antisocial habits of female orangs.”

zees are preadapted to the food-sharing behavior found in simple human societies. Dominant adult males in particular may share food to reduce social conflict, since such conflict can involve loss of the food item to a scramble of others, injury, and/or disruption of important male-male coalitions upon which male status frequently depends. Recent experiments with captive chimpanzees by de Waal (1989a) suggest that turn taking in the exchange of social favors prevents one-sided accumulation of benefits and that individuals who are reluctant to share have a higher probability of encountering aggression. Further, there is some tendency among chimpanzees to suspend dominance relations and introduce turn taking in reciprocating grooming for access to food—at least under experimental conditions when the concentrated food is only moderately attractive and given to a single-male group. Even in free-ranging conditions, food sharing does not always occur along lines predicted by the dominance hierarchy (Nishida 1990:28; Takahata, Hasegawa, and Nishida 1984).

Sharing of floral resources is more common and tolerated among bonobos (see Furuichi 1989; Kuroda 1984; Kano 1983, 1990; Badrian and Badrian 1984; Badrian and Malenky 1984). Vegetable food is commonly shared between males and females, “and there are descriptions of females clambering onto the shoulders of males to reach overhead delicacies” (Goodall 1986:485). However, agonistic encounters remain most frequent “during feeding, directed from a high-ranking male to lower-ranking male” (Susman 1987:79). Though mammalian predation appears much less frequent than among common chimpanzees, forest bonobos do kill and share faunal resources. Males’ sharing of meat with females often involves or leads to copulation, females being “allowed to take parts of the carcass after copulating with the male possessors.” The distinctive genito-genital rubbing that takes place between female bonobos is also frequently observed during food sharing and has been interpreted as a tension-reducing as well as a food-solicitation mechanism in this context (Kuroda 1980, Thompson-Handler, Malenky, and Badrian 1984, Kano 1984a, de Waal 1987).

Even among bonobos, however, possessors of food (except for mothers vis-à-vis their infants [Kuroda 1984:312]) never approach those without it. When in the presence of others, bonobos possessing food shared it on their own initiative less than 1% of the time (p. 317). Food sharing—perhaps more accurately termed “food transfer”—occurred particularly through active begging as part of a “food taking bout.” Bonobo food transfer of prized fruit items parallels the common-chimpanzee transfers of meat described above (Kuroda 1984:303–4), and Kuroda notes (p. 306) that allowing others to share in a plentiful food source is perhaps better described as “co-feeding” than as “sharing.”

In general, it appears that great apes do not willingly share food, especially scarce food, with conspecifics (other than offspring). Bonobos constitute a partial exception. Common chimpanzees may be preadapted to food-sharing behavior through elaborate communication

concerning food, begging, tolerance of scrounging, and ability to mitigate competitive behavior in the context of collective eating. As Itani (1988) suggests, this may represent an incipient ability to develop the more egalitarian sharing relationships found in simple human societies. There remains, however, a significant qualitative difference between food transfer among free-ranging great apes and the rule-governed sharing of food and other valuable resources in simple human societies. The strong internalization of a sharing ethic is in many respects the *sine qua non* of culture in these societies (see also Ingold 1987:114).

Dominance Structure

Perhaps the most striking thing about simple human societies is how decentralized they are. Instead of individuals’ striving to be “first among equals,” aggressively assertive, or powerful—striving to be big-men—there tends to be active and assiduous devaluation of adult male status differentiation and minimization or denial of those asymmetries of ability that exist. Self-aggrandizing behavior is disparaged and open coercion considered highly improper (see [!Kung] Draper 1978; Marshall 1976; Lee 1979b, 1982; [Inuit] Briggs 1970, 1978; [Mbuti] Turnbull 1961, 1965a, b, 1978; [Semai] Dentan 1978, 1979; Robarchek 1977; Robarchek and Dentan 1987; [Hadza] Woodburn 1979). Leadership is rudimentary and uninstitutionalized, and political life is communal. Patriarchy and elders’ authority are minimal, and leadership is itself rarely a matter of assertion, dispute, or competition. Decisions are most frequently reached through casual consensus, in which no man has authority over another. Major collective enterprises tend to emerge spontaneously as the result of myriad fluid conversations that mix stories, banter, fantasies, and plans. As Ingold (1987:chap. 9) points out, politics in simple societies maintains a fine balance between individual autonomy and the collective appropriation of nature.

Among complex hunter-gatherers and with the advent of sedentism and horticulture/agriculture, male status differentiation increases (see archeological evidence in Price and Brown 1985, Zvelebil 1986, Bailey 1983; see Price 1984). Though the range of variation is enormous and the dynamics complex (e.g., Feinman and Neitzel 1984), the progressive development of overt status differentiation and competitive leadership is apt to be influenced by the functional requisites of coordinated action among larger social groups in sedentary societies (e.g., Upham 1990a). Property and possessions increase with sedentism, and the potential for material wealth differentials also increases (Johnson and Earle 1987). Opportunities increase for selective control of the flow of information and material resources and the development of social inequality (Bender 1990). For both political and economic reasons, competition over access to positions of control intensifies, and various forms of leadership and status hierarchy emerge: gerontocracy, ritual elder-

ship, pronounced age-grading, headmen, war leaders, priests, big-men, and chiefs. Such status distinctions become progressively formalized in the evolution of political society prior to the rise of the state (e.g., Fried 1967). With increasing socioeconomic complexity and hierarchy, administrative control and organization become crucial, along with unequal control of the means of production (e.g., Claessen and Skalník 1978, Friedman and Rowlands 1978). In lieu of more nuanced description, it may be said that actively competitive male leadership hierarchies have been common in human political evolution since the advent of complex hunter-gatherers and sedentary societies.

All of the great apes have male dominance hierarchies (Wrangham 1987). This pattern is thrown into relief by the relative lack of dominance hierarchies among great-ape females (de Waal 1986). Male dominance over females is the norm, and with the notable exception of bonobos (F. White 1989, Furuichi 1989) males are the focal points of great-ape group cohesion.

Gorilla group structure is dominated by a single adult male (Jolly 1985:132). Between 64% and 77% of gorilla groups have but a single silverback (Harcourt, Fossey, and Pi Sabater 1981), and the silverback is the focus of a cohesive and long-lasting group of females, juveniles, and, to a lesser extent, subadult males (blackbacks) (Schaller 1976, Fossey 1983). As Harcourt (1979:189) summarizes,

In groups in which there was more than one silverback, one (the oldest) was clearly the leader, and the other(s) occupied peripheral positions. The leading silverbacks were the protectors of the group; it was they who most frequently stopped intragroup fights; it was they who most frequently controlled the timing and direction of group movement; and it was the leading silverbacks around whom most animals most often congregated, even when the groups were undisturbed. Only silverbacks, not blackbacks, were seen to mate with primiparous and multiparous females.

Among orangutans, there is also clear domination of younger males and females in consort by full adult males, though there is no bounded social group over which such males preside. Adult orangutan males are characterized (MacKinnon 1979:265) "by the full development of secondary sexual adornments including long hair and beards, full throat pouches, high fatty crowns, expanded cheek flanges, and large size. These animals indulge in loud, long-range calling, defending range boundaries against other males."

Chimpanzee males exhibit several clearly distinguishable dominance levels, including alpha, high, middle, and low (Takahata 1990a, Bygott 1979). Dominance is established ultimately through aggressive displays, encounters, and fights. Longitudinal studies of rank (Takahata 1990a; Bygott 1979; Goodall 1986:chap. 16) document a variety of strategies for intimidating opponents and gaining status. Particularly distinctive are chimpanzee male-male coalitions to challenge the dominance of

higher-ups, especially the alpha male (see also Takahata 1990b, Kawanaka 1990, de Waal 1982). In contrast to those of many monkey species, chimpanzee adult males rarely if ever transfer out of their home groups, even when dethroned; transfers are limited to females and their offspring (Nishida 1979; Goodall et al. 1979; Goodall 1986:489). Though normal assertions of dominance are responded to with pant-grunting or displacement and other encounters may result in aggressive display and/or chasing, genuine challenges at the top of the hierarchy frequently result in severe wounds and permanent injuries. Death from such wounds within free-ranging chimpanzee groups is strongly suspected in several cases (when the wounded male disappeared abruptly and was never found) and has been documented definitively among a large captive group of chimpanzees (de Waal 1982; 1989b:chap. 2).

Male dominance hierarchies exist among bonobos, but there is a lower incidence of male-male affiliative and agonistic behavior, and male-male coalitions apparently do not occur (Kano 1990, Badrian and Badrian 1984, Furuichi 1989, F. White 1990). In contrast to that of common chimpanzees, bonobo social organization can be considered "female-based," with "strong affiliation among females and between males and females, but not among males" (F. White 1989:204; see also Furuichi 1989). This pattern poses a significant anomaly for *Pan*-based models of male-collective intergroup aggression in hominid evolution. Bonobos form quasi-stable subgroups within a cohesive troop with a shared home range. Males rarely if ever transfer out of this larger group. Patterns of bonobo aggression may be quite pronounced (de Waal 1989b:221):

Although the remarkable gentleness of the bonobo species has been noticed by other investigators, we should also realize that, until a decade ago, the same opinion prevailed with regard to gorillas and chimpanzees. Now we know better. Recently, Takayoshi Kano [1984b] published a rather shocking report on physical abnormalities in free-living bonobos. An astonishing number of them lack fingers, toes, even entire hands. Two-thirds of the males and one-third of the females show limb abnormalities. . . . The higher incidence of missing or deformed body parts among males, especially adults, supports a link with aggression. And the tendency of bonobos to aim bites at the extremities may explain the nature of the defects.

Damaging fights have not, however, been witnessed (de Waal 1989b:221–22), and techniques of managing conflict seem highly developed; in this respect, bonobos may exhibit important similarities with simple human societies in harboring both strong conflict-mediation skills and the potential for rare but ultimately extreme violence.

In general, and again with the partial and/or possible exception of bonobos, great apes exhibit marked male dominance hierarchies maintained and altered by aggressive display, fighting, and violence. Sub-alpha-

male-male coalitions are marked among common chimpanzees but largely absent in other ape species. Among gorillas and chimpanzees males are the focus of group cohesion; bonobos are more female-based, and cohesion among orangutan adults is limited to mating dyads.

In selected formal respects, dominance hierarchies in middle-range human societies are more similar to those of great apes (their other huge differences notwithstanding) than to those of simpler human societies. In both great-ape and middle-range human societies, competitive dominance relations entail concrete, behaviorally regularized relations of superordination and submission among adult males and systematic inequalities in access to valued resources. Hierarchical relations are ultimately negotiable and subject to coalitional strategizing. Dominance hierarchies are an important and often pre-eminent male concern. In the simplest human societies, by contrast, cultural emphasis is on precluding rather than facilitating male status distinctions. The development of the capacity for forming male hierarchies is effectively undercut by a combination of ecological, social, and cultural forces. Conversely, if, as de Waal (1989a, b) has suggested, chimpanzees and bonobos have the capacity to suspend hierarchies temporarily in sharing and reconciliation, the particular conditions of their evolution have not had much leveling effect on male dominance hierarchies in free-ranging populations. As Whallon (1989:448–49) notes,

If we adopt a basically primate model (more specifically ape and in particular chimpanzee) . . . we can see, among other things, that the typical pattern of dominance relations among individuals . . . would not be particularly adaptive in environments of low resource density and predictability. It would prevent an effective internal distribution of resources in the group, which therefore could not take advantage of the risk reduction available with division of labour and particularly with separation of labour.

As a result, he concludes, the late Paleolithic saw the culmination of an evolutionary trend toward the “replacement of ape-like systems of interpersonal dominance established through relatively constant display, combat, and trial and error, by systems of at least relatively egalitarian, stable, and reliable relations of rights and obligations among individuals both within and between local groups.”

The available evidence thus suggests that the trajectory of male status differentiation in human evolution is U-shaped rather than linear. Correspondingly, similarity between great apes and middle-range human societies in terms of competitive male dominance hierarchies may be based on analogy rather than homology, in contrast to the assumptions of current sociobiological reasoning (e.g., Betzig 1986, Betzig, Borgerhoff Mulder, and Turke 1988; cf. also Wrangham 1987, Manson and Wrangham 1991, Tooby and DeVore 1987). The tenuousness of such analogies is underscored by contrasting patterns among simple human societies. It is quite possible that patterns

analogous to those of simple societies characterized a significant portion of our evolution as *H. sapiens*.

As we have seen, the relative absence of male dominance hierarchies in simple human societies does not preclude the occurrence of severe male violence. The interface between this violence and intense sociality is all the more in need of explanation in that it is not easily accounted for by theories often used to explain the collective, reciprocating conflict common in middle-range societies (see Knauf 1987a). To probe this question, it is necessary to consider male-female relations and, in particular, evolutionary contrasts in patterns of male sexual competition.

Male Competition for Sexual Access to Females

The conflict between sexual self-interest and cooperative affiliation must have been profound during the early evolution of human social organization. Distinctive features of the social evolution of *H. sapiens* if not *Homo* generally in all likelihood included high male parental investment, a significant sexual division of labor, the sharing of valuable food throughout a group of 25+ related and unrelated individuals, and exchange of information and flexible access to resources among several such dispersed but interlocking forager groups. This form of organization provided crucial adaptive advantages for humans relative to social carnivores, solitary and herd herbivores, and omnivorous nonhuman primates. As noted above, however, the regular dispersal of individuals to exploit patchy or unpredictable food resources made mating exclusivity and paternity certainty problematic. The human solution to this problem is arguably unique (contrast Foley 1987).

As Freud and the early Lévi-Strauss elucidated, human societies have developed symbolically mediated social and psychological constraints on individuals' sexual impulses; sexual control in humans is both psychically internalized and socially and symbolically maintained. It may be suggested that the threat posed by immediate and disruptive self-interested sexual behavior in the evolution of *H. sapiens* was to a significant extent, though by no means totally, countered by cultural prescriptions fostering intra- and intergroup cooperation.

How this process may have arisen out of processes of standard natural selection is an intriguing question to which the work of Boyd and Richerson (1985) provides important insights. If imitative learning is strongly selected for as a rule-of-thumb adaptive strategy—as it is likely to have been among early humans, a species dependent upon prolonged socialization—then phenotypic traits may spread very rapidly. Added to this, and no doubt in causal concert with it, is the highly developed ability of humans to communicate through elaborate symbolic communication. As has recently been suggested by Goodenough (1990), Bickerton (1990), Steklis (1985), and Marshack (1989a), the propensity toward elaborate symbolic communication was probably highly

developed even if not fully equivalent to modern language during the evolution of archaic *H. sapiens* and possibly *H. erectus*.⁸

8. This assessment is but little compromised by suggestions that the fully modern repertoire of human linguistic and symbolic capabilities may not have arisen until 45,000–35,000 B.P. (e.g., Mellars and Stringer 1989, Lieberman 1984, Chase and Dibble 1987, Davidson and Noble 1989, Binford 1989). The fallacy of linking symbolic facility narrowly with relatively elaborate archeological evidence of ritual and art has been exposed by Lindly and Clark (1990), who point out that Upper Paleolithic assemblages until about 20,000 B.P. typically lack evidence of elaborate symbolism (p. 239; cf. also Dibble 1989). Gamble (1990:243) notes that even the colonization of North America and the North European Plain after 13,000 B.P. are “marked by very few if any” directly symbolic artifacts. Obviously, language and protolanguage were important in human evolution long before the regular encoding of symbolism in durable artifacts (cf. Bickerton [1990:176] on the “perils of fossilism” in the study of language evolution). Clear evidence exists for some form of complex symbolic capacity and corresponding behavior at least as far back as *H. erectus* (Marshack 1985, 1989a), including beads, animal-bone pendants, and other elaborate decorative items in Mousterian assemblages (e.g., R. White 1989) and fire-hardened hardwood digging sticks, post holes, ocher crayons, and huge amounts of red ocher powder in association with Acheulian finds, some dated to several hundred thousand years B.P. (Marshack 1989a).

That some of this evidence for human symbolic capacity may indicate supernatural belief and ritual behavior is particularly significant in evolutionary terms (e.g., Solecki 1971, 1975; Trinkaus 1983; cf. Wreschner 1981; Marshack 1981, 1989b). As Rappaport (1971a, b, 1979) has suggested, ritual reinforces and insulates from argument shared propositions about the world and fosters deep-seated cognitive acceptance of and behavioral compliance with these propositions. Religious belief and ritual emphasize broad social objectives and cultural values, often advancing group goals as opposed to more immediate individual self-interest. Self-interest is of course in common if not constant tension with group-level goals and constraints, but such goals and constraints have themselves long exerted an important influence on human behavior and on the cognition and motivation that underlie it. Among humans, internalization of values that propagate group interests is likely to have been important for social functioning from an early period, as Durkheim (1965 [1912]) long ago suggested.

These issues are sometimes overshadowed by current debates about “replacement” versus “continuity” hypotheses concerning the preponderance of anatomically modern humans in Europe at 45,000–35,000 B.P. (see Trinkaus 1989, Smith, Falsetti, and Donnelly 1989). The remarkable spread and socioecological adaptation of *H. sapiens* prior to this time argue for some kind of highly developed linguistic facility. Of particular present relevance is that the faunal data “imply that sharing was a regular feature of Middle Paleolithic economic life” (Chase 1989:333). It appears quite likely on both conceptual and anatomical grounds that Middle Paleolithic populations had some elaborate form of speech (Marshack 1989a, Bickerton 1990; see Arensburg et al. 1989 concerning anatomical evidence). As Whallon (1989:450) notes, “it seems most unlikely that fully developed language capacities could have emerged from other than an already evolving system of symbolic communication (cf. Bickerton 1981:261, *et passim*). It seems equally unlikely that kinship, for example, as an organizing principle in cultural systems, could have emerged from an organization entirely lacking in the definition of social roles and positions.”

Bickerton (1990:chaps. 6 and 7) has recently suggested that complex protolanguage was likely characteristic of *H. erectus* and that fully syntactic language was characteristic of archaic *H. sapiens*. The existence of some complex but not fully modern protolanguage does appear consistent with trends characteristic of *H. erectus* such as increased encephalization, increased subsistence flexibility, greatly increased home-range size, and habitation dispersal to non-

Through socialization and symbolic communication, behavioral traits can be learned and spread—even when they are not maximally adaptive—faster than they can be eradicated through biogenetic selection. This creates the potential for the temporary spread of maladaptive customs in a human population—what Durham (1991:chap. 7) calls cultural-genetic opposition. In addition, however, it allows the spread of behaviors that can favor the sociocultural group at the expense of a given individual’s inclusive fitness (contrast Hamilton 1964). As a result, with extensive symbolic transmission—itsself initially favored by standard Darwinian selection—group selection and genuine altruism become possible. Put differently, biogenetic selection gives rise to a cultural transmission process that ultimately becomes partially decoupled from it. This does not condemn humans to biogenetic dysfunctionality; it simply adds the cultural group to the individual as a separate and competing unit of selection.

The assumption of many researchers that the individual is the unit of selection in human evolution is increasingly being challenged. From ethnography and demography, queries are raised by the existence of behavior patterns that systematically compromise rather than maximize the reproductive success of individual actors (e.g., Vining 1986; Knauff 1987a, b, 1989a; Moore 1990). From social psychology, sociobiological assumptions have been questioned on the basis of experiments that document the existence of altruistic tendencies toward strangers in the absence of rationally expected payoffs (e.g., Caporeale et al. 1989, Dawes, van de Kragt, and Orbell 1988). And from theoretical biology, questions are raised by increasing realization that the conditions under which self-interested reciprocal altruism can explain cooperation are more restrictive than previously thought (e.g., Boyd and Lorberbaum 1987). At the same time, there is increasing recognition that group

tropical ecozones. Protolanguage is also consistent with the complex but relatively standardized Acheulian tool kit. The increased technological sophistication, openness, and productivity of Mousterian disk-core technology, by contrast, may reflect cognitive capacities consistent with grammar and syntax in archaic *H. sapiens*. A further consideration of the Middle Paleolithic transition, however, might suggest that the speech of archaic *H. sapiens* included syntax and productivity but lacked full duality of patterning (cf. Tomasello 1991; Parker 1985:624–25; Parker and Gibson 1979; see Hockett and Ascher 1964). Relative to Upper Paleolithic ones, Mousterian assemblages were arguably undeveloped in “third-order” objectification—blanks made for specific parts of elaborately fashioned composite tools and the careful making of tools such as burins that were used to make other tools. Conceptually analogous, syntactic language without duality of patterning lacks the intralexical productivity that recombines word-making sounds to increase the number and diversity of linguistic referents.

Though specific details of language evolution are subject to debate, it appears highly likely from a broader perspective—even neglecting the potential for species continuity and the origin of anatomically modern humans approaching 100,000 B.P. (Smith, Falsetti, and Donnelly 1989; cf. Mellars 1988, 1989a)—that elaborate forms of linguistic communication facilitated the remarkable development and spread of humans from the time of archaic *H. sapiens* and probably since *H. erectus*.

selection may help explain the existence of widespread reciprocity and altruism (e.g., Boyd 1988, Boyd and Richerson 1990a, Rogers 1990) and that cultural transmission may operate through selection parameters that are nonbiogenetic, nonindividualistic, and/or superorganic (e.g., Boyd and Richerson 1985, 1990b; Richerson and Boyd 1989; Harpending and Rogers 1987; Nowak and Sigmund 1989; Durham 1991; see more generally Wilson and Sober 1989, Wilson 1989; contrast Hamilton 1964; Trivers 1971, 1985; Axelrod and Hamilton 1981).

In the same way that, from a neo-Darwinian perspective, the individual has been suggested to be a gene's way of producing another gene (e.g., Dawkins 1989), so too an individual in a human cultural environment is to a certain extent a culture's means of reproducing and spreading a given set of symbols—propagating a collective symbolic system. What results is complex coevolution of distinct behavioral transmission and selection systems, one symbolic, the other biogenetic (Durham 1991, Boyd and Richerson 1985). The increased speed and elaboration of cultural as opposed to biogenetic transmission processes render symbolic effects increasingly influential on behavior over time, but the tension between them is never eliminated. Robert Paul (personal communication; cf. 1987) has suggested that a kind of "arms race" emerges between cultural constraints upon sexual impulses and biogenetic selection pressures that encourage mating. This may well have made humans among the sexiest and simultaneously the most sexually repressed of species.

Cultural control of sexual impulses has never been complete; threats to cooperation and integrity posed by illicit sexuality and its concomitant disruption have always been present. The unprecedented transmission of behaviors and mental motivations through cultural means, however, has resulted in significant group-cooperative control over sexuality. Rule-governed cultural control of sexual behavior, even if partial, could facilitate cooperation and the sexual division of labor, thus increasing the survival rate of the group.⁹

In simple human societies, cultural appropriation of sexuality is crucially evident in (1) the institution of marriage, (2) frequent monogamy despite collective group living, (3) widespread classificatory extension of the incest taboo (elaborate exogamy), and (4) marital exchange and alliance.

Marriage confers rights of sexual access. Though these norms are not uncommonly broken in simple societies (e.g., Shostak 1981), sexual norms do circumscribe sexual activity for most persons to a great degree (e.g., contrast, for !Kung, Lee 1979b:chap. 6). Simple societies often reduce the discrepancy between norm and reality by making the establishment of marriage socially flexible (e.g., Lee 1979b:chap. 6; Balikci 1970:153–62; Wood-

burn 1972:205; Turnbull 1961). Premarital and postmarital sexuality are often tolerated, and in some cases extramarital sexuality is itself culturally controlled and appropriated for alliance purposes—as in Eskimo wife-exchange partnership (Balikci 1970:140–43). Finally, norms of sexual fidelity are underscored by the violent repercussions of breaking them. Though many simple societies tolerate polygyny or do not actively proscribe it, the cultural and statistical norm for most adults in simple societies remains monogamy (Lee 1979b:79; Turnbull 1965a, b). In contrast to the situation in many of the more complex prestate societies, polygyny is not a prominent index or symbol of differential adult male status (contrast Flinn and Low 1986).

One of the most important sociopolitical dimensions of cultural sexual control in simple societies is affinal alliance predicated on rules of extended exogamy (e.g., Lévi-Strauss 1969 [1949]). Though incest avoidance of various kinds has also been documented among primates, the social and political importance of extended elaborate exogamy is distinctive and enormous among humans. Marriage in simple societies creates enduring links of reciprocity, and coresidence, subsistence cooperation, and/or sharing among close affines are highly developed (e.g., Lee 1979b:chaps. 5 and 6; Turnbull 1965a, b; Damas 1984). Affinal cooperation, operating among kin who are culturally created, is in many ways a symbol of cultural viability. (In addition to affinity, simple societies are characterized by a variety of extrakinship or fictive-kin relationships—trade partnerships, namesake relations, ritual/totemic affiliations, and kinlike classificatory relations—that link persons in extensive social networks [e.g., Guemple 1972; Balikci 1970:chap. 6; Wiessner 1982; cf. Yengoyan 1984]. Extensive social ties have been inferred from archeological evidence at least as far back as the Upper Paleolithic [e.g., Gamble 1982; 1983; 1986:386–91; Whallon 1989]).

Though the importance of cultural constraints upon sexuality can hardly be overemphasized, there remains a poignant tension in simple societies between cultural norms and individual desires. As Collier and Rosaldo (1981) have noted, marriage and legitimate sexual access to a woman are predominant markers of male adulthood, and these rights are fervently protected. Correspondingly, much of the severe violence that does occur is ultimately related to male sexual disputes over women (Knauf 1987a:477). Displacement of affinal or sexual tensions also appears to underlie much of the seemingly irrational violence over "trivial" issues that occurs in many egalitarian societies (e.g., Lee 1979a:chap. 13; van der Steenhoven 1959; Hoebel 1964). Sexual tensions in these societies are normally kept in check by norms of affinal harmony, group cooperation, and personal propriety. When they are ultimately galvanized, however, they are frequently quite intense. This threat is exacerbated by the absence of political leaders or dominant individuals who might exercise control and of institutionalized or formalized redress mechanisms. Indeed, violence occurs in significant degree to prevent some individuals from acquiring sexual dominance.

9. Boyd and Richerson (1990b:124) suggest that group selection for cooperative behavior is most likely for hard-to-learn traits, and Rogers (1990:408) suggests that group selection via selective emigration is facilitated by mobility rather than by isolation of local groups.

Violence in simple societies may be aggressively self-interested, e.g., aimed at dethroning a rival and procuring a woman from him as a spouse (e.g., Balikci 1970:chap. 7). This violence may occasionally be successful, but it tends to be disapproved of by the group at large and may result in compensatory violence at its initiative. Moreover, if the aggressor is successful in killing his primary rival, he may be considered an outcast because of his breach of norms and may be unable to obtain support even among his closest kin. In only 1 of the 22 homicides listed by Lee (1979a:383) for the !Kung did the killer run off with the victim's wife, and this case is itself revealing; despite the fact that the couple had previously been lovers, the woman was frightened by the killing and as a result soon returned alone. In most simple societies, aggressively self-interested persons may be killed with the consent or active collaboration of the community at large (see Lee 1979a:chap. 13; Balikci 1970:chap. 9). This responsive violence can in a sense be considered a form of execution or capital punishment (see Otterbein 1986, 1987). As Otterbein emphasizes, it tends to uphold norms (such as egalitarianism and sexual propriety) that are crucial to group survival.

Often, however, the rationale for violence in simple societies is not so clear-cut. Norms of sexual propriety are internalized by the individual even though they conflict with strong sexual desires. It is thus not surprising that violence often erupts suddenly in a displaced, distorted, or noninstrumental manner. For instance, Lee (1979a:397) states for the !Kung, "This is a society in which a high proportion of 'crimes' are 'crimes of passion.' It may be useful to consider !Kung fighting as a kind of temporary insanity or running amok rather than as an instrumental act in a means-end framework." Lee notes further (p. 392),

The most striking aspect of the killer-victim relation . . . is that in the majority of cases *the victim was not a principal in the verbal conflict that led up to the actual killing with arrow or spear*. In only 8 of the 18 cases on which I have data was the victim a principal in the previous argument. In 10 other killings, the victim was struck more or less at random: in 3 cases a man came to the aid of another and was killed; in 4 cases a peacemaker was fatally wounded; and 3 victims (2 of them women) were bystanders.

That !Kung are superb marksmen with spear and arrow underscores the blind fury of the event. As Lee writes, "!Kung men are excellent shots when hunting game, but are poor shots when aiming at each other." This kind of dissociated behavior is similar to the sudden passion of Mbuti arguments (Turnbull 1961), strongly dissociative violence among Inuit (Rasmussen 1932:17; Briggs 1982), and the much-contested "blood drunkenness" among Semai (Dentan 1979:58–59; Robarchek and Dentan 1987). Cognitively displaced and projective aggression may also occur as violent scapegoating of persons within the community (Knauff 1985, 1987a).

Some forms of violence in simple societies thus appear almost more dysfunctional than functional and bear at least a passing resemblance to the syndrome of "phylogenetic regression" described by Bailey (1985, 1987; cf. Neuman 1987). Bailey argues on neurophysiological grounds that sudden aggressive outbursts stem from phylogenetically "primitive" parts of the brain and characterize various forms of genuine brain dysfunction. While his claims about phylogenetic regression—that it can explain myriad types of aggression and violence—are too sweeping, his model may apply to certain forms of simple-society violence, particularly those galvanized by sexual tensions (see also Konner 1982:chap. 9). Given its phylogenetic and neurophysiological underpinnings, the human aggressive potential would have been difficult if not impossible to suppress entirely, particularly for males in the context of mating competition (see Hamburg and Trudeau 1981, Blanchard and Blanchard 1984; cf. Valzelli 1981). The internalization of cultural norms conflicts powerfully with this impetus, however, and can exacerbate psychic conflict and dysfunctional aggression.

It may be emphasized that symbolically mediated controls on sexuality that facilitate group-adaptive behaviors do *not* replace or negate individualistic sexual strategizing; biogenetic propensities for fitness maximization continue to be acted out. However, the enormous competing influence of cultural norms in constraining human sexual behavior—sociologically and psychologically as well as symbolically—cannot be ignored. To argue that violence in simple societies is driven by sociobiological selection pressures simply because it often relates in some fashion to sexual frustration is to miss the distinctive impact of cultural rules upon sexual behavior and the implications of this for sociosexual conflict among humans. It is arguably the tension *between* group-symbolic and individual-biogenetic imperatives that is responsible for the distinctive features of sociosexual conflict in simple human societies.¹⁰

Middle-range societies on the whole exhibit much greater emphasis than simple ones on explicitly targeted competition between men over female sexuality. Correspondingly, these societies on the whole provide greater and more consistent sexual rewards for men who are successful in aggressive male status competition. In a significant number of known "tribal" and "chiefly" societies, for instance, polygyny is both an index and a reflection of status or rank. For instance, Feinman and Neitzel's (1984:58–59) tabulation of leadership status

10. It could be countered that exceptionally intelligent individuals can enhance their reproductive success while appearing to conform to community norms. For instance, since the distinction between homicide and capital punishment is often murky in simple societies (Knauff 1987a:491–92), community norms could be strategically manipulated by self-interested individuals smart enough to subvert them and get away with it. In the long run, however, this would stimulate increasingly intelligent countermeasures by the society at large. Sexual drive and its cultural control are thus at once logically antithetical and mutually reinforcing, and rule-governed control over sexuality is not reduced but increased by its potential contravention.

prerogatives in 51 New World prestate societies reveals that multiple wives are a concomitant of leadership in 39.2% (20/51) of the cases. Male wealth differentials may be translated into differential reproduction through the use of bridewealth payments to procure new wives. Betzig (1986) has extended this general line of reasoning to posit a link between despotism and differential reproduction. Despite the many problems with her argument and counterexamples (e.g., Moore 1990; cf. also Knauf 1987*a, b*), a connection between male prestige and reproductive success appears more plausible for these societies than for simple ones. It does appear that reproductive advantage is one of the concomitants—though by no means the exclusive cause—of victorious status rivalry in many prestate societies in which male status is overtly and vigorously contested (e.g., Chagnon 1979, 1988). Carneiro (personal communication, 1981) has further suggested that polygyny (and corresponding reproductive variance) increases greatly as a prerogative of leadership with the appearance of chiefdoms. Thus, for instance, paramount chiefs frequently use wealth and power to arrogate unto themselves a substantial number of mates and/or wives.

Great-ape dominance hierarchies are strongly linked to male competition over sexual access to females. Particularly among gorillas and orangutans, this selective pressure has led to extreme sexual dimorphism and to distinctive physical and display characteristics in adult males (e.g., Rodman and Mitani 1987). Females of both species show strong sexual preference for an adult as opposed to a mature subadult male. In part because of injurious competition between them, fully mature males in these species seldom interact. In those confrontations that have been observed, the larger, stronger male drives off his competitor. Violent fights typically occur when one of the competitors does not quickly give way. The following is an account for orangutans (Galdikas 1979:213):

One such [encounter between mature males] occurred when the resident male, TP, was in consortship with a mature female, Priscilla. A visiting male moved toward the couple. The resident male charged toward him and a fight ensued, which lasted 25 minutes. Fighting consisted mainly of chasing and furious grappling, including biting at each other's face, shoulders, and hands. . . . Finally, they separated and sat facing each other 10 meters apart. The resident male threw a snag [stripped branch] and called; the other male then disappeared while the victor went off in search of his receptive female (and her offspring) who had slowly moved away foraging while the combat was taking place.

Mitani (1985) found that most male-male orangutan interactions occur in the presence of females. Large males actively disrupt the mating of other males, with the highest-ranking adult male consistently displacing others. A high frequency of male orangutans are physically disfigured by fights, and it is quite likely that some mature males are effectively excluded from reproduction

or killed outright (e.g., Galdikas 1979:216, 230). Female orangutans are strongly drawn to mature males in their home ranges, and the forceful attempts of subadult males to copulate with females (when an adult male is absent) are typically resisted fervently by females themselves. What may be termed rape sometimes occurs in such contexts (Galdikas 1979; see MacKinnon 1979).

Among gorillas, the cohesive social group and harem of the silverback male is threatened by maturing blackbacks. These young males eventually leave their group, become solitary until more fully adult, and then attempt through competition to gain females from existing groups and hence form social and breeding groups of their own (Schaller 1976, Fossey 1983, Harcourt 1979). Though adult gorillas tend to avoid each other, confrontation between them ultimately tends to be quite violent (see below).

Among common chimpanzees, the relationship between dominance and sexual access is less uniform. Many males establish temporary consort relations with females, and these tend not to be aggressively contested. However, nonconsort mating—when receptive females are at the peak of estrus in a group context—is very frequent (Goodall 1986:442), and here aggressive male sexual competition is pronounced (Tutin 1979). To some extent, the chimpanzee alpha male or the highest-ranked male present can monopolize a female in a group context when she is at the peak of estrus (Goodall 1986:452, 472–73). This pattern, evident at Gombe and among captive chimpanzees (de Waal 1982), has been documented definitively among Mahale Mountain chimpanzees, with alpha-male status conferring “a great reproductive advantage” in copulation as well as nutrition (Nishida 1970; 1990:28). Alpha males enforce a markedly possessive mating pattern which allows them to copulate at an exceptionally high rate with the most fertile females near their time of ovulation (Hasegawa and Hiraiwa-Hasegawa 1983, 1990; Takahata 1990*a*).

Systematic data about the relationship between bonobo dominance patterns and mating are apparently not yet available (Wrangham 1987:65). Bonobo sexual relations are particularly promiscuous and exhibit a high frequency of copulation outside the period of maximal female sexual swelling (Badrian and Badrian 1984, de Waal 1987). Bonobos form subgroups comprising two to eight males and one to eight females and may also form consortships. Thus, “many, perhaps all females have close long-term relationships with particular males within the community” (Wrangham 1986:368; see Furuichi 1989, F. White 1989, Kano 1984, Thompson-Handler, Malenky, and Badrian 1984). The relationship between this process and dominance is little known. Recent research by Dahl and Nadler (1989:19) suggests that mild male sexual aggression is involved in the high frequency of bonobo sexual activity and that further study is needed “to determine whether this is intimidation, as defined for the other great apes (Nadler 1988), coercion, or persuasion.” Preliminary evidence suggests that copulation of bonobo males with high-ranking females is indeed related to their period of maximal sexual swelling,

whereas noncyclic heterosexuality serves as a tension-regulation and conflict-resolution mechanism closely related to dominance—occurring particularly between males and immature or subordinate females and sometimes involving no intromission or even penile erection on the part of the male (Dahl 1987, Furuichi 1987).

In summary, competition between males over mating is evident among all the great apes, only partially excepting bonobos. Resulting differentials in male reproductive success make such male aggressiveness subject to significant natural selection (Smuts 1987). This is evident anatomically in pronounced sexual dimorphism among single-male gorilla and orangutan breeding groups and a quite high testes-size/body-weight ratio among chimpanzees and bonobos, whose social organization includes promiscuous multimale mating. Humans, however, have neither of these crucial anatomical indices of male sexual competition, and this pattern is both highlighted and perhaps to some degree explained by the culturally mediated ability of humans to maintain pair-bonded sexual relations within a diffusely cooperative multimale group. In social terms as well, it appears that violence systematically enhances mating access of dominant males among great apes but much less so in simple human societies. Among the latter, a male challenger, even if victorious, may be a social outcast rather than gaining access to his rival's mate. As is evident by the violent end that recidivist killers themselves ultimately meet among the !Kung and other simple societies, violent competition to gain sexual access to women may limit rather than increase lifetime male reproductive success.

Some sociobiologists have suggested that sexual violence among human males may be a "high-risk" mating strategy for underprivileged males (e.g., Thornhill and Thornhill 1983; see Daly and Wilson 1983, 1988). However, the highly egalitarian nature of male-male relations in simple societies—including the normative institution of marriage for adult men—makes it unlikely that some adult males will be systematically "underprivileged" in sexual access (e.g., Draper 1975, Turnbull 1982, Lee 1982). Reproductive success is in these cases unlikely to increase with interpersonal aggression and may even show a negative association with it. This is consistent with cultural values in these societies: interpersonal aggression and violence tend to be unrewarded if not actively devalued by men and women alike. Among societies in which kin or territorial groups are coherent and have exclusive interests, it could be argued that killing of anyone on "the other side" increases the fitness of one's group and oneself relative to one's enemies (see Daly, Wilson, and Weghorst 1982). However, simple societies tend to lack such exclusive territorial groups. Indeed, their subsistence strategy is often highly dependent on nonexclusive access to resources and on diffuse territorial linkages. As a result, ethnocentric killing is rare and cannot easily be considered to increase inclusive fitness in any event.

In significant contrast to simple human societies, great-ape and middle-range human ones display similar-

ties, or at least analogies, between male dominance and differential sexual access. Again, then, the known range of variation belies simplistic assumptions of uniformity over the course of human evolution, cautioning in particular against drawing homologous conclusions from male status competition in great-ape and human "tribal" societies.

Violence and Intergroup Competition

In simple human societies, exclusivity and boundedness of social groups are largely precluded by shifting resource availability, fluid population movement, lack of fixed property, and the need for intergroup alliance and support. Territorial rights, while often formally recognized, are rarely enforced when permission to hunt or forage is requested (Balikci 1970:170; Lee 1979b:87; Turnbull 1965a; see also Myers 1986; cf. Hamilton 1982). Band membership tends to be fluid, shifting easily to exploit available resources. Local groups also share information about availability of subsistence resources, and it has been suggested that the advantage of such information sharing was a major selective force in the evolution of human linguistic communication (Kurland and Beckerman 1985).

With emphasis on egalitarian access to resources, cooperation, and diffuse affiliative networks, contrary emphasis on intergroup rivalry and collective violence is minimal. Even apart from cultural injunctions and affiliative needs, the shifting location and composition of bands tend to undercut the demographic basis for uniformly opposed territorial groups. Given migratory patterns and resource dispersal, resources are difficult if not impossible to defend, and the cost of such defense typically outweighs its benefit (Netting 1986:chap. 1). Likewise, the cost of defense and retaliation against armed aggression is typically great; it is more expeditious to move away. This tends to short-circuit patterns of feud and systematic raiding or warfare (see Woodburn 1984, Turnbull 1984, Lee and DeVore 1984).

Some authors have projected such reasoning quite far back in human evolution. Concerning *H. erectus*, Campbell (1985a:326) writes: "conflicts between bands, if they occurred, must have been rare in an uncrowded world. . . . They probably came after humans settled down on the land, became a more numerous species, and forged cultures that encouraged individual and group pride in possessions, territories, and beliefs." Gellner (1989) suggests that systematic use of coercive force as an organizational feature of society was undeveloped prior to the advent of food storage and agriculture.

The question of territoriality and armed conflict may under certain conditions be more complicated. There is some historical evidence of reciprocating collective conflict, sometimes ethnically based, among simple foragers (Balikci 1970:182–84; Lee 1979a:382; Clastres 1972; K. Hill, personal communication; Griffin 1984:103–7; Robarchek 1990). Feuding or warfare does not, however, appear pronounced except where, as among the Ache,

Agta, and Waorani, large-scale intrusion by agricultural societies resulted in conflict over land and internal societal reorganization.¹¹ Apart from the influence of state societies, collective enmities in simple societies tend to be minimal and to occur between groups that lie outside the extensive networks of affiliation that link adjacent bands and territories. Travel to and armed conflict against persons in such areas tend to be infrequent.

In middle-range societies, social competition increases with the increase in fixed, high-value resources, sedentism, and population density. Even where population density is low, valuable movable resources such as large domesticated animals may become a source of intergroup antagonism and systematic hostility (e.g., Bedouins and herders with respect to camels and livestock, Plains Indians with respect to horses). With sedentism and/or significant domestication of plants or animals there is a proliferation of corporate groups that stress exclusive membership and rituals of allegiance (e.g., Plog 1990:193; see also Smith 1975). Ethnic differentiation and ethnocentrism become more pronounced, and fraternal interest groups become increasingly important in armed conflict to protect or extend access to valued rights and resources (Otterbein and Otterbein 1965, Otterbein 1968; see also LeVine and Campbell 1972). Johnson and Earle (1981:60) suggest that in "increasingly widespread and increasingly successful efforts to restrict access to critical resources, we encounter the beginnings of warfare." Paige and Paige (1981:75–78) have shown cross-culturally that a stable and valuable resource base—such as herds or cultivated lands—is highly correlated with fraternal-interest-group strength and, indeed, a better predictor of it than residence pattern. This underscores the difficulty of using simple forager/sedentary characterizations in a human-evolutionary context.

Some researchers, including Haas (1990), have drawn upon the typologies of Service (1971) and Sahlins (1968) to suggest that increased warfare in sedentary societies is a key dimension of what is termed "tribalization." Others, such as Braun (1990; Braun and Plog 1982), emphasize multidimensional adaptations of sedentary communities, including networks of trading alliance among villages and increasing ritualization, leadership delegation, and dispute. In either case, both the potential for and the incidence of collective armed conflict between opposed groups would appear to increase. Feinman and Neitzel (1984:48–51) found warfare to be the single most commonly reported function of leadership in sedentary prestate societies in South and Central America and eastern North America. Black (1990) has suggested that chronic vengeance as a mode of conflict management is especially pronounced when social groups are characterized by immobility, social distance, equality, and organization—all typical of middle-range societies. In a cross-cultural analysis of aggression, Ross (1985, 1986)

documents, among other things, a direct association between socioeconomic complexity and external warfare in prestate societies.

Certainly in those areas of the world where small-scale sedentary societies have persisted until recent times or been subject to intense archeological study, warfare has often been shown to have been frequent and intense, including in most parts of Melanesia (Knauf 1990b, Meggitt 1977, Berndt 1962, Koch 1974, Hallpike 1977, Clunie 1977), Polynesia (e.g., Goldman 1970, Vayda 1960), and parts of Southeast Asia (R. Rosaldo 1980, M. Rosaldo 1980, Bock 1985, Kiefer 1972, Gibson 1990), South and Central America (e.g., Chagnon 1968, 1983, 1988; Harner 1972; Ross 1984; Whitehead 1990; Carneiro 1990; Drennan and Uribe 1987), North America (e.g., Drago 1970, Ewers 1958, Grinnell 1956, Wallace and Hoebel 1952), Africa (e.g., Sahlins 1961, Kelley 1985, Fukui and Turton 1979, Kuper 1937, Vansina 1966), the Middle East (e.g., Meeker 1979; Hardy 1963; Barth 1961, 1965), and Europe (e.g., Boehm 1984a, Moss 1979). Warfare and raiding have also been documented among a range of complex hunter-gatherers, including equestrian or sedentary foragers and selected prehistoric cases (see Ember 1978, Frayer n.d., Wright 1988; cf. Price and Brown 1985).

While certainly admitting an enormous range of variation in frequency and intensity of warfare, these societies exhibit a much greater tendency toward collective armed conflict and toward culturally competitive ethnocentrism than simple societies. The tendency toward warfare may be yet greater when paramount chiefdoms are created through conquest (Carneiro 1981, 1990) and is also highly associated with—if not partly causative of—the rise of the state (Carneiro 1970, Haas 1982, Gabel 1990; cf. Claessen and Skalník 1978).

Among the great apes, male intergroup killings have been documented in gorillas and chimpanzees, are extremely likely in orangutans, and are uncertain, suspected, or under investigation among bonobos. However, no great apes are territorial in the strict sense of the term.¹² Among all these species and particularly orangutans, home ranges are to some degree flexible and overlapping. However, challenges to the dominance hierarchy or to the integrity of breeding units are subject to strong and aggressive defense. Among solitary orangutans and in the harem-group organization of gorillas, intergroup violence and violence between individual adult males are largely synonymous. Violence occurs among orangutans as aggression between mature males over a female in consort with one of them. Male violence in intergroup contexts among gorillas is ultimately crucial in establishing and maintaining control of a social and breeding group. Fossey (1979) documents several such cases, including one in which a lone silverback exhibited aggressive displays and chest-beating, vio-

11. Dense rain-forest areas, where visibility is minimal, offer the potential for effective surprise raiding, but the exploitation of such habitats was relatively late because of its difficulty in the absence of plant domestication or trade with sedentary populations (Campbell 1985b:chap. 2; Ichikawa 1983; Bailey et al. 1989).

12. A definitive case for territoriality can be made for gibbons (*Hylobates lar*), which are less closely related to humans than the larger apes. Gibbons are arboreal and monogamous and have small, well-defined home ranges that are continuously occupied and vigorously defended by males (see Carpenter 1940, Ellefson 1968).

lently charged into a group, effected the killing of an infant, and later went off with the infant's mother. The existing information on adult male-male gorilla interactions is summarized by Wrangham (1987:66):

For gorillas intergroup interactions have been seen in the Virunga and in Kahuzi. In the Virunga about 80 percent of encounters involved violent displays, and 50 percent involved physical aggression by adult males (Harcourt 1978). Severe wounding (Harcourt 1978) and probably death (Baumgartel 1976) of adult males can result. Furthermore, five out of a total of 38 infants have apparently been killed by attacks from adult males during intergroup encounters (Fossey 1979, 1981). In Kahuzi three interactions were reported by Yamagiwa (1983). There was no physical violence, but there were fierce displays in two of them. Furthermore, an infected wound which led to the death of a breeding male was apparently caused by attacks from a lone male.

In short, male gorilla breeding success is significantly related to violent confrontation with males from other groups.

Violence among great apes both within and between conspecific groups is best documented among chimpanzees (Goodall 1986:chaps. 15, 17; Goodall et al. 1979; Nishida 1979, 1983; Nishida et al. 1985; de Waal 1982; cf. Itani 1979). Systematic confrontation and killing between troops of free-ranging chimpanzees have been well documented at two research sites and have been the subject of considerable professional interest. At Gombe, a chimpanzee group that had split off from another was systematically exterminated by members of the latter over a period of five years (Goodall et al. 1979; Goodall 1986:chap. 17). During this period, all five adult males and one female from the victim group were apparently killed by the intruders. (Several of these kills were conclusively documented.) Remaining females were absorbed into the victorious group. During this process, the home range of the victims was systematically occupied for foraging by the intruders. After the old group was exterminated, the new larger group itself became subject to predation—by another adjacent chimpanzee troop to the south—and was forced to contract its home range from 17 to 6 km² over four years; the deaths of at least two infants and one adult male are suspected to have been caused by the invaders. At Mahale, a chimpanzee group gradually became extinct as a social, geographic, and breeding unit over a period of 15 years; during this period all seven of its adult males died without replacement (Nishida 1979, Nishida et al. 1985). Intergroup fights, woundings, and the sudden disappearance of several prime adult males strongly suggest that as many of six of these deaths were brought about violently by an adjacent group. As the number of males was reduced, females were incorporated gradually and later en masse into the intruding group. Correspondingly, the territory of the victim group was absorbed by the invaders.

Chimpanzee males in particular monitor the periph-

eral areas of their home range. This is undertaken through distinctive patrolling behavior, characterized by "cautious, silent travel during which the members of the party tend to move in a compact group" (Goodall 1986:490). Animals on patrol carefully watch and listen for evidence of occupation by outsiders and suppress all normal calls among themselves. This pattern alters dramatically if individuals from the adjacent group are encountered. Males and anestrus females are aggressively intimidated and, if alone, violently attacked or effectively "hunted" by the coordinated effort of several males in the patrol. Once seized, the individual may be beaten and bitten until wounded or dead. According to Goodall (1986:529), the five observed cases of lethal conspecific attack at Gombe have several features in common:

(a) the attacks were all long—the shortest lasted at least ten minutes, and three continued more than twice as long; (b) all were gang attacks, during which the aggressors sometimes assaulted the victim one after the other, or two to five assailed the victim simultaneously; (c) all the victims were, at some point, held to the ground by one or more of the aggressors while others hit and pounded; (d) all the victims, in addition to being hit, stamped on, and bitten, were dragged first in one direction, then another . . . and (g) during each incident the observers, all thoroughly experienced in chimpanzee behavior, *believed* that the aggressors were trying to kill their victims. . . . [This is] because the attackers showed some of the patterns which, while commonly seen during the killing of large prey, have not been seen during *intracommunity* fighting—as when one of Goliath's legs was twisted, when a strip of flesh was torn from De's thigh, or when Satan drank the blood pouring from Sniff's nose.

There are several possible causes for such intergroup killings. In the Gombe study area, there was some evidence of added resource pressure—caused by land encroachment by humans—that may have exacerbated aggression and violence (Goodall 1986:51). The degree of land impingement, however, has not been judged severe enough to explain such severe and persistent violence. Goodall (1986:chap. 17) concludes that chimpanzees are a territorial species and that land areas are defended and contested by males, even though these territories have no fixed boundaries and need not be continually occupied by their possessors. A further cause of chimpanzee intergroup aggression is the enhanced sexual access and reproductive success of males in the invading group. Group annihilation need not greatly affect population density for very long, while the number of males and infants is temporarily depressed, the transfer of reproductive females to the new group quickly facilitates repopulation of the area (Nishida et al. 1985:298). The additional food resources of the newly occupied territory aid in this process. Given these reproductive enhancements, intergroup violence by chimpanzee males appears subject to strong natural selection.

This conclusion is supported by broadly similar relationships between social organization and intergroup violence in Gombe and Mahale. Several cases have been observed in which infants from outsider groups have been seized, killed, and even eaten by males of an opposed group. The mother in such instances not infrequently joins the males of the attacking group, resumes sexual cycling, and becomes receptive for mating with her new male companions. There is obviously strong selective advantage for males in killing infants sired in other groups and then reproductively appropriating the recycling mothers for themselves (as also occurs quite dramatically among gorillas). Sexually receptive females are usually tolerated peacefully when encountered by males of adjacent chimpanzee groups, and immigrant females tend to be quite sexually active in this context (Hasegawa 1989).

Bonobos appear to be somewhat less agonistic than chimpanzees in *intragroup* relations, and recent evidence suggests that their intergroup relations are correspondingly less aggressive (Kano 1990). Nonetheless, those few bonobo intergroup confrontations observed included competitive vocal displays, withdrawal of the smaller party, and one violent incident causing "serious injuries to several individuals" (Kano and Mulavwa 1984:265; see Kano 1984*b*, Badrian and Badrian 1984). Long-term trends of bonobo intergroup relationship have not yet been documented. Given that many years of observation among chimpanzees were necessary before the extent of intergroup aggression could be established, no firm conclusion can yet be drawn concerning the frequency and severity of bonobo intergroup violence (Wrangham 1987:66; de Waal 1989:221, quoted above). It does appear, however, that a relatively rich resource habitat, relative lack of predation, and intragroup social bonds facilitated by diffuse and frequent sexual encounters combine to minimize intergroup contact and intergroup aggression among bonobos (Kano 1990, Blount 1990).

With the apparent and/or partial exception of bonobos, then, the evidence suggests that intergroup violence among great apes is both pronounced and highly related to reproductive success. The chimpanzee pattern in particular has certain features in common with ethnocentric and aggressive intergroup encounters in human sedentary and pastoral prestate societies (see Boehm n.d.*a*), and this pattern contrasts significantly with the more flexible and cooperative intergroup dynamics of simple human societies. Several authors, including Wrangham (1987; Manson and Wrangham 1991), Foley (1988:219; cf. Foley and Lee 1989), and Ghiglieri (1987, 1989), have attempted to draw a parallel between the patrilocality of the great apes (though bonobos are a partial exception) and the social organization of prestate humans in general. As Barnard (1983:196–97) has shown, however, the notion of the patrilocality band among human foragers is "empirically groundless," being based on the legacy of the early and erroneous—if influential—typologies of Steward (1936) and Service (1971, 1979): "New generations of scholars gave the

coup de grace to the patrilocality band [of hunter-gatherer band organization]. All over the world, societies of small community size were shown to be neither essentially virilocal nor patrilineal in any sense. 'Flux,' 'flexibility,' and 'fluidity' became the . . . words to describe their social organization (see Lee and DeVore 1984:7–12)." Of particular relevance here is his criticism of the Human Relations Area Files study by Ember (1978), which suggested that hunter-gatherers were typically patrilocality and prone to warfare; he finds this suggestion untenable given "the inaccuracy of the early ethnographies on which her *Ethnographic Atlas* sample is based" (p. 197).

Manson and Wrangham's recent study (1991) is to a certain extent an advance. On the one hand, it distinguishes between groups of foragers in terms of the presence or absence of significant alienable property (cf. Testart 1982, 1985) and documents that intergroup violence more frequently occurs over resources in the former category. This finding is consistent with the present analysis. However, Manson and Wrangham rely on Ember's (1978) analysis of forager warfare and appear to adopt her biased assessment of forager patrilocality (see, similarly, Foley 1989:487–88). Consequently, they posit a similarity between prestate human social organizational patterns and chimpanzee patterns of male philopatry (males breeding within their natal groups) and violent male attacks on outside groups (cf. also Otterbein 1985:xxi; Ghiglieri 1987, 1989). These pongid patterns may provide an analogy with some sedentary human societies and complex hunter-gatherers, but they are highly questionable as a model for simpler human groups.¹³

To illustrate the importance of delimiting the sample of simpler human societies from more complex hunter-gatherers, a subset of the 563 societies in Murdock's (1981) *Atlas of World Cultures* was defined in terms of (a) absence of agriculture, significant animal domestication, and primary subsistence reliance on fishing (i.e., 0 in Murdock's col. 7, pts. 4 and 5, 0–4 in col. 3, and 0 in col. 39) and (b) absence of significant sociopolitical class distinctions (0 in col. 67). Of the resulting 39 societies, 71.8% (28/39) were rated by Murdock as having an "absence of any patrilineal kin groups and also of patrilineal exogamy" (0 in col. 20). In contrast, 59.0% had cognatic kin groups recognizing ambilineal or bilateral descent (B or K in col. 24). Only 25.6% (10/39) were rated as exhibiting patrilocality residence (P in col. 16), the remainder being characterized as practicing various combinations of ambilocality and uxilocality residence or virilocal residence "confined to instances where the husband's patrilineal are not aggregated in patrilocality and patrilineal kin groups." These trends would probably have been still more pronounced if cases based on somewhat questionable older data had been excluded and if a less rigid ty-

13. Stanford and Allen (1991:59) cogently criticize several recently proposed models of human behavioral evolution as being chimpanzee-referent models couched in Darwinian terms to give the appearance of a broader evolutionary perspective.

pology of residential types had been used.¹⁴ These findings are consistent with ethnographic suggestions above that social organization and residence tend to be shifting, open, and flexible among nonintensive foragers. Available evidence thus supports the conclusion that fraternal interest groups and the kind of violence associated with them are seldom of importance in simple human societies.

Overall Patterns of Sociality and Violence

In simple human societies, strong emphasis is placed on cooperative sociality both within and between flexibly constituted groups. Cultural values and behavior strongly indicate sharing of valuable food items and material property, flexible access to resources, and extension of sociality through diffuse networks of classificatory kinship, namesake, totemic, and/or trade partnerships. Both within and between groups, rates of aggression are low. The aggression that does occur, however, has a relatively high probability of resulting in homicide, with dispute resolution measures other than dispersal undeveloped. Violence in simple human societies is generally unrelated to disputes over material property, territory, competitive leadership interests, status hierarchy, or opposition between corporate or ethnic groups; it is often if indirectly related to sexual disputes. While adult male competition over sexual access to women is to a significant extent controlled by cultural rules of pair-bonded sexual union within extended multimale/multifemale social groups, disputes over sexuality, when they do erupt, often result in severe violence within the band or larger community. However, the killings that result are often not an effective way to gain a new spouse or lover.

In middle-range societies, by contrast, violence is related to frequent disputes over male dominance and political status hierarchy and sometimes also to conflicts over property and territorial resources. Aggressively achieved male status domination is more likely to result in increased access to mates and/or polygyny. Middle-range societies also tend toward a stronger ethic of competitive virility linked to positive valuation of male assertiveness and aggression in gender relations, politics, and warfare. Violence between corporate or ethnic groups is more frequently collective, more often occurs between fraternal interest groups, and is more frequently reciprocated in raiding or warfare than in simple societies. Ongoing blood feuds are relatively common. All of these features vary in complex ways and correlate with various social structural and socialization factors (M. Ross 1985, 1986; Otterbein 1980, 1985; Knauff 1990b).

Known socialization practices are consistent with

these broad contrasts. Simple societies have been consistently noted as particularly indulgent and nonpunitive in their child-rearing and adolescent socialization practices, including a high degree of supportive paternal as well as maternal contact with young children (see generally Leacock and Lee 1982:8; West and Konner 1976; Konner 1981; [Mbuti] Turnbull 1978, Tronick, Morella, and Winn 1987, Hewlett 1990; [!Kung] Draper 1978, Marshall 1976; [Semai] Dentan 1978, Robarchek 1977; [Inuit] Briggs 1970, 1978, 1982). In contrast, child rearing and adolescent socialization in small-scale sedentary societies tend on the whole to be relatively harsher and more punitive, including a greater frequency of traumatic male initiations (cf. Rohner 1980, Lambert 1971, Whiting and Whiting 1975). Paige and Paige (1981:77) conclude on the basis of detailed cross-cultural study that "in societies in which there are stable and valuable economic resources, strong fraternal interest groups are likely to develop, and the dilemmas posed by the major events of the human reproductive cycle are responded to by the form of ritual bargaining characterized . . . as surveillance rituals." These conditions maximize a group's "ability to make explicit bargains concerning women and children and to protect such bargains through military action of a large and loyal political faction" (pp. 76–77).

These trends are influenced by the socialization capacities afforded by the larger size of residential age cohorts in aggregated sedentary communities. Children in simple societies have few age mates and tend to play in multiage and cross-sex groups, with few rigid boundaries among them. In larger sedentary communities, there are greater numbers of same-sex age cohorts and greater potentials for age-grading and formation of interest groups. Age-cohort differentiation can occur not only in adult male leadership but in child-child socialization, with age-cohorts of older boys socializing and not infrequently dominating their juniors and with sex-segregated play and socialization becoming more common. Not surprisingly, age-sex status differentiation and accompanying relations of social inequality are frequent mechanisms for developing strong warriors among the male initiate class (e.g., Langness 1974, Allen 1967).

Among great apes the most severe forms of violence appear related to enhanced sexual access and reproductive success for male victors. In all great-ape species for which data are available, defeating male competitors systematically increases the winner's sexual access to receptive females. Killing the female's offspring sired by another male brings the female more quickly into estrus. Females commonly gravitate to such successful males of their own volition, and in this sense male violence is actively selected for through females as well as through males. Among chimpanzees, extermination or dispersal of competitive males may also increase the home range of the victorious males, thus increasing their access to food resources and the nutritional fitness of themselves, their mates, and their progeny. Coalitional male violence among chimpanzees benefits coalition members by intimidating and/or eliminating attack targets both within and between groups. Among orang-

14. If Australian Aboriginal societies (which, as we have seen, are exceptional among nonintensive foragers in a variety of ways) are excluded, the Murdock-ranked percentage of simple societies lacking patrilineal kin groups increases to 83.9% (26/31), the percentage having cognatic kin groups increases to 74.2% (23/31), and the percentage lacking patrilocal residence increases to 87.1% (27/31).

utans and gorillas, violence is pursued by adult males only as individuals, and selection thus operates directly in promoting large male size. Whereas sexual dimorphism is pronounced among single-male gorilla and orangutan breeding groups and a high testes-size/body-weight ratio occurs among chimpanzees (whose social organization includes promiscuous multimale mating), humans have neither of these crucial indices of male sexual competition. In the context of multimale mating groups, this suggests that cultural rules may have reduced male sexual competition in human evolution.

Among bonobos, the incidence of nonaggressive food transfer is relatively high, male dominance and sexual competition appear relatively undeveloped, sexual dimorphism is low (Zihlman and Cramer 1978), and intergroup aggression, though not yet thoroughly investigated, may be somewhat lower than among other great apes. These and other aspects of bonobo organization have been considered suggestive in modeling the behavior patterns of early humans (see Susman 1984, 1987; Furuichi 1989). The present analysis supports this view but points to major qualitative differences between bonobos and the simplest human societies (see also Blount 1990). Bonobo patterns of diffuse sexuality and use of sexual contact as an appeasement strategy contrast sharply with the rule-governed and restricted patterns of mating in simple human societies. Bonobo food sharing is tacit rather than active, and relative lack of aggression is due as much to a plentiful environment and relative freedom from predation as to a propensity for cooperative social interaction. The actively cooperative sociality of early humans in a predator-rich savannah environment was probably significantly different from and much more strongly selected for than the patterns of affiliative sociality found among bonobos. As has often been noted, no single species is apt to provide an adequate model of early human social organization.

Conclusions

Patterns of sociality and violence are in certain formal respects similar among great apes and middle-range human societies but systematically different among simple human societies. Male competition in resource control, dominance hierarchy, overt competition over sexual access to females (including polygynous mating), and competitive defense of the social group are all arguably greater among both great apes and middle-range societies than among the simplest human societies.

This comparison is based on superficial analogy; indeed, the divergence of simple societies from these trends underscores that correspondences between great ape and middle-range human societies are not homologies based on phylogenetic continuity through human evolution (contrast Wrangham 1987; Ghiglieri 1987, 1989; Foley and Lee 1989; Tooby and DeVore 1987). Thus, no assumption can be made of uninterrupted evolutionary progression from primate patterns to those found in human "tribal," much less state, societies (contrast Otterbein 1985:xxii, Bigelow 1975; Eibl-Eibesfeldt

1979; Popp and DeVore 1979; Chagnon 1979, 1988). That the evolutionary period characterized by simple human societies may have been many times longer than that characterized by middle-range ones suggests that findings about violence and sociality based on selected case studies of the latter may be limited in their evolutionary implications (e.g., Chagnon 1988).

The present analysis recontextualizes Wrangham's (1987:68) assessment, based in part on a lumping of simple with more complex human societies, that the common ancestor of humans had "closed social networks, hostile and male-dominated intergroup relationships with stalk-and-attack interactions, female exogamy and no alliances between females, and males having sexual relationships with more than one female." This and similar arguments by Ghiglieri (1987, 1989), by Foley (1988:217–19) for late Pleistocene *H. sapiens sapiens*, and by Manson and Wrangham (1991) for human evolution generally are here countered by distinguishing between simple and more complex human societies as points of primatological comparison and by reasoning "backward" rather than "forward" in evolutionary time—projecting simple human society traits into the evolution of *H. sapiens* and perhaps *Homo* generally rather than projecting nonhuman primate tendencies forward into hominid and then equally into human evolution.

Nonhuman primate models of human social evolution are likely more applicable to early hominids than to humans. Conversely, models based on simple societies are likely to have greater relevance for *H. sapiens* and perhaps for *Homo* generally. Rather than reduce these to competing species-archetype models, however, it is important to address the question how and over what period of time the distinctive features of human cultural transmission and corresponding social alteration emerged. From the present perspective, the evolution of *Homo* is likely to have proceeded in large part among groups that had relatively open social networks, nonhostile intergroup interactions, and a significant degree of institutionalized if not monogamous pair bonding. More generally, the distinctive "cooperative niche" discernible in simple human societies needs to be considered alongside the "social carnivore niche" and the "cognitive niche" that are so often attributed to them in models of hominid evolution (Knauf 1988, 1989a; Ingold 1987; Carrithers 1990; cf. Foley 1982, 1984; Hill 1982; Tooby and DeVore 1987). That cultural rules of cooperation are pronounced in such societies does not preclude violence, but it does facilitate patterns of sociality and diffuse sharing that may have been characteristic of a large portion of our genus's evolution. Generalizations about human societal evolution are easily biased by HRAF samples weighted heavily with middle-range societies, which are far more numerous in the ethnographic record than simple ones though they have persisted for a much shorter period of evolutionary time.

The present model is not intended as a definitive or an exclusive alternative to others, and it is itself self-defeating in that it uses static types such as "simple societies" to argue for developmental changes in pat-

terms of sociality and violence in the course of human evolution. If these patterns have indeed changed, it is hardly to be expected that they were static within the category of "simple societies" itself. It could be, for instance, that patterns of violence and sociality among late Pleistocene hunters of periglacial Eurasia, who were highly dependent on very large game (offering the potential for large aggregations of consuming foragers and sizable frozen food stores), were somewhat more like those among complex hunter-gatherers than were those of foragers relying more on dispersed floral resources and smaller game (cf. Foley 1988:217–19; Mellars 1989b:356–57). More generally, the difference between simple- and complex-forager patterns of violence and sociality may parallel differences in resource concentration or population aggregation that potentiate them. Highly decentralized, nonintensive foraging adaptations are, on a global scale, likely to be both underrepresented in the archeological record and subject to less scholarly interest than the relatively dramatic material assemblages of more socioeconomically complex prehistoric groups, but the bulk of our genus's evolution was spent as simple foragers.

The range of variation within the category of nonintensive foragers has in fact been underemphasized here, in part for the sake of brevity and in part to highlight larger, more pronounced, and more neglected aggregate differences. That the delayed-return reciprocity systems, male status distinctions, patrilocality, polygyny, and conflict between fraternal interest groups found in some Australian Aboriginal societies are rare or absent among nonintensive hunter-gatherers elsewhere suggests that this cluster of traits may among simple societies be an Australian isolate (cf. Testart 1988). The range of variation in great-ape and middle-range societies, if anything even more evident from observational data, is likewise collapsed here for the sake of illuminating larger evolutionary trends. Like any other evolutionary typology, this one is useful as a heuristic device to stimulate disconfirmation and promote more sophisticated and refined hypotheses (see Upham 1990a:88–91).

Despite inevitable problems, the comparative assessment of empirical data from great-ape and simple- and middle-range human societies is crucial. Lately, the relevance of these findings has typically been viewed in terms of neo-Darwinian assumptions of individualistic competition. It has been suggested here that the strengths of evolutionary biology and behavioral ecology should be complemented by a fuller and more sensitive consideration of symbolic transmission and cultural rules of cooperation in human evolution. In this regard, humans may indeed be unique.

Postscript

Rodseth et al.'s (1991) suggestions about human social organization, derived from extensive cross-species comparison with nonhuman primates, are in important ways both convergent with and divergent from the findings

of the present analysis. The similarities and differences reveal important possibilities for further research and theory building.

This paper's findings are consistent with Rodseth et al.'s statement that "humans are unique in the extent to which both males and females form affiliative relationships, with nonkin as well as kin, both within and between groups" (p. 232) and their assessment that humans are unique in forging alliances through systematic exchange of mates, e.g., that intergroup affinity among humans should be "appreciated as a unique and revolutionary primate pattern" (p. 237). They differ, however, with regard to the suggestion that human social organization consists of closed or semiclosed groups that tend toward male philopatry (males breeding within their natal groups) and fraternal interest groups. As we have seen, such generalizations (a) collapse middle-range or "tribal" society patterns with those of simple societies, (b) rely on Ember's (1978) skewed cross-cultural analysis, and (c) tend to project nonhuman primate patterns of violence and social organization onto humans. Alliances among local groups in simple human societies tend to be highly flexible and shifting, importantly including coresidence among adult male affines for significant periods of time.¹⁵

In the social organization of the common ancestor of apes and humans, a tension could plausibly have existed between chimpanzee-like patterns of male philopatry and selective pressures for more open, dispersed, and flexible alliances, and such tension may have been played out and resolved differentially in the several competing australopithecine species (Foley 1989:487–89). By the time of *Homo*'s development and the progressive elaboration of human cultural transmission, however, development may have turned decisively away from male philopatry and closed fraternal interest groupings and toward more open and more flexible social networks.

Elaborate symbolic communication and cultural transmission were likely crucial in maintaining the pattern of diffuse alliance in the absence of ongoing spatial proximity that Rodseth et al. rightly emphasize. This dovetails with the elaboration of cultural constraints upon domestic behavior to maintain exclusive sexual bonds in the face of diurnal dispersion/reunion and a sexual division of labor. From Rodseth et al.'s perspective, "the problem . . . would not be how early hominids came to avoid incest or how one sex came to breed in other groups but how exclusive sexual bonds evolved from a chimpanzee-like pattern of promiscuity" (p. 237).

15. This conclusion is nicely developed through detailed empirical analysis for the Mbuti by Terashima (1985; cf. also Pedersen and Woehle 1988) in contrast to the more simplistic residential categorization of Bailey and Aunger (1990). The characterization of early human social organization as largely male philopatric, closed or semiclosed, and divided into fraternal interest groups rests uneasily with the other features of Rodseth et al.'s own analysis, which would appear to emphasize the distinctive openness of human social networks. This implicit tension appears to force an expansion of the notion of fraternal interest to accommodate even matrilineal alliances, making the "interest group" hardly "fraternal" at all.

My intuition is that, given the geometric decrease of genetic relatedness with genealogical distance, inclusive-fitness benefits are insufficient to outweigh the threats to pair-bonded sexual exclusivity and to male parental investment posed by sexual cheating in a regularly dispersing forager group of 25–50 persons—even if the males of the group are all agnatically related.¹⁶ In other words, an independent force of cultural as opposed to biogenetic selection is needed. Wrangham's perspective could be construed as supporting such an assessment insofar as it suggests that language was likely crucial as an aspect of absentee mate-guarding—i.e., that nonsymbolic behavior-selection variables were by themselves insufficient to maintain such a mating system. This raises the question how a uniquely human rule-influenced mating system could have evolved.

It will be important to develop competing analyses of the likely timing and extent of cultural development in humans. My own analysis, which emphasizes the potential for group selection that cultural transmission affords, predicts that from an early period in human evolution there is a crucial and driving opposition between cultural and biogenetic selection processes. Durham's (1991:chap. 8) fruitfully competing hypothesis is that cultural and biogenetic selection processes, while opposable in principle, tend in the main to support each other in fact. To me this seems to give too little attention to the significant conflict between group-level and individual-level selection and the increasing gap between fast rates of symbolic dissemination and slower rates of differential biogenetic reproduction. This is obviously an area for further study and refinement. An attempt has been made here to characterize the opening stages of this relationship, addressing issues that Rodseth et al. independently raise by implication but do not directly consider.

Cross-species analyses can indeed be valuable, and Rodseth et al. are to be congratulated for illuminating key overall differences in the social organization of humans and nonhuman primates. With humans in particular, however, one must be wary of assuming continuity of social organization across the evolving spectrum of socioeconomic intensification. As Rodseth et al. recognize (fig. 3), their own analysis can in principle be refined to include patterns of intraspecific organizational variation. There are, however, some intrinsic limits to such a procedure. Considering humans only in sociobehavioral terms makes it difficult to give adequate consideration to the distinctive dynamics of human symbolic transmission and the selective effects of this transmission upon subsequent evolutionary development. An analysis of symbolic dynamics as well as socioecological patterns is therefore crucial in the study of human evolution.

Comments

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Knauf has made a significant contribution to our understanding of violence and warfare in an evolutionary context. The breadth of his paper is such that I lack confidence to comment on all its arguments; these comments will focus on his interpretation of warfare and violence in non-state human societies. Incidentally, contrary to an oft-expressed opinion (as in Foster and Rubinstein 1986:xii), the bibliography of the anthropology of warfare is lengthy and contains numerous works of high quality (Ferguson and Farragher 1988; see also Ferguson 1984b). While I agree with the general tone of Knauf's paper and with his conclusions, there are several major areas where I would question his analysis.

I applaud Knauf's analytical category of "simple human societies." Too many fish and fowl (or, rather, fishers and fowlers) have been lumped together as "foragers" or "band societies." Knauf, however, contrasts these with "middle-range societies," and surely the diversity among societies in this group is far greater than that among foraging peoples. His emphasis on fraternal interest groups in this category ignores the many such societies that are matrilineal and matrilocal (Divale 1974, 1984). It also ignores the egalitarian ideology, the absence of statuses possessing authority, and the nature of leadership in many of these societies (see Trigger 1990). Knauf's characterization of "middle-range" societies emphasizes those with social ranking (those we used to and occasionally still call "chiefdoms"). To be fair to him, he phrases these characteristics in evolutionary terms, seeing these institutions as developing. However, as Mann (1986:67) has observed, "movement toward rank and political authority seems endemic *but reversible*" (my emphasis); ambitious elites that attempt to impose authority frequently find themselves deposed or simply with no subjects, the egalitarian-minded population having moved elsewhere.

Also troubling is a failure to consider the effect of state or imperial expansion (both military and economic) on "middle-range societies" (see Wolf 1982, Ferguson and Whitehead n.d.). Frequency of violence and warfare is doubtless greatly increased by desire for trade, displacement of populations, ecological disruption, employment as allies by neighboring states, etc.; one can point to analyses of Iroquois history by Hunt (1940) and Trelease (1962) and to explanations of warfare on the North American grasslands (Newcomb 1950). Any state expansion has an impact on its neighbors, but European imperialism has had a strong effect on our ethnographic sample. Parker's (1988:115) observation on the early stages of European expansion is telling: "The principal export of pre-industrial Europe to the rest of the world was violence."

This ignoring of history also leaves open the question,

16. This issue can perhaps be illuminated through mathematical modeling.

as Donald (1987) has noted in a critique of an earlier paper by Knauff, whether Knauff's "simple human societies" are simply products of the marginal environments they exploit and the resulting low population densities. While "simple human societies" may be simpler than any others known to ethnography, they also may be simpler than those of earliest *H. sapiens* (or even earlier *Homo*) known only from the archaeological record.

I also feel it is incorrect to see, as Knauff does, "similarities, or at least analogies," between polygyny and the mating patterns of a silverback male gorilla. Marriage is much more than simple coresidence and sexual access. The multiple spouses of elites may relate much more to politics than to sex. Marriage also does not guarantee exclusive sexual access to one's spouse. The Tiwi (Hart and Pilling 1960) are a classic example of a society in which multiple marriages are linked to the high status accorded elderly males whose prime days for fathering children are long past.

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Culture is keeping the Gebusi from behaving adaptively. For the second time in four years, Bruce Knauff has made that case in CA. For the second time, I'm not convinced (Knauff 1987, Betzig 1988).

Knauff draws parallels among great-ape societies, "simple" human societies, and "middle-range" human societies. He looks at conflict—dominance within and violence between groups. He looks at cooperation—food sharing and other forms of affiliation. And he looks at reproduction—which males get more females and, probably, father more young. And he draws this conclusion: Among apes and in middle-range human societies, dominance and violence among males are positively related to reproductive success, but among simple people like the Gebusi, neither dominance nor violence increases fitness. In Gebusi and other simple societies, culture triumphs over nature; an ethic of cooperation wins out over genes for conflict.

What's wrong with this argument? Two things, at least. First, it's not at all clear that dominance and violence in simple human societies are not related to reproduction. In fact, what work has been done suggests that they are. Hewlett (1988), for example, found that Aka Pygmy leaders are more than twice as polygynous as other men and tend to father more children. Qualitative statements are consistent. Osgood (1958:200, 203), for instance, noted that "powerful" Ingalik men might acquire second wives and added that "a long time ago there was a fellow who had five wives at one time and seven at another. This man was a great fighter and had obtained his women by raiding." As Lee's interviews of the !Kung, which Knauff reviews, suggest, a killer may

not always get the girl—that day—but even if he doesn't he may gain the resources or respect that help him get another woman on another occasion. Darwin (1871:896) wrote long ago that "polygamy . . . is almost universally followed by the leading men." As Knauff rather grudgingly admits, this seems to be true in middle-range societies (Betzig 1986); it seems too to be true in ancient (Betzig n.d.a) and medieval (Betzig n.d.b) societies, and it may even be true among "simples" (e.g., Hewlett 1988) and moderns (e.g., Low n.d.).

Second, I think that the importance of cooperation among most people and primates is underplayed. As Knauff writes, and as others have written, food sharing can be essential in simple human societies faced with environmental uncertainty and risk. But food sharing is ubiquitously human; redistribution is everywhere, from the smallest band to the biggest state. And other kinds of cooperation are crucial among other primates. As do humans, apes cooperate, at least, *in order to* compete. If food sharing or some other kind of cooperation helps keep sharers alive, helps them get mates, and helps them raise children, then cooperation should be as "natural" as the kinds of conflicts that can, under different conditions, be a means to reproduction. Again, the evidence that I'm aware of suggests that it is. Kaplan and Hill (1985b) found that better Ache hunters attract more extramarital mates, father more children, and raise more of them than poorer hunters (see also Hill and Kaplan 1988). And again, qualitative conclusions are consistent. Marshall (1959:346), for instance, wrote that among the !Kung "the number of wives a man may have is not regulated by social rules but by his ability to obtain and support them." And Jenness (1922:161) pointed out that a Copper Eskimo polygynist "must be a man of great energy and skill in hunting, bold and unscrupulous, always ready to assert himself and uphold his position by an appeal to force." There should, in short, be genes for cooperation as well as for competition; both should be naturally selected when they increase their bearers' reproduction.

One bone that Knauff picks, that correspondences between ape and human societies may reflect "homologies based on phylogenetic continuity through human evolution," seems to me unlikely to stand up to much if any evidence or theory. Species are, by definition, set apart by enough evolutionary time to allow for significant change. It seems reasonable, then, to suspect that similarities between them exist because similar behaviors have been adaptive under similar conditions rather than because phylogenetic legacies made them persist against selective force. And it seems ironic that the idea that "culture" has to win over "nature" is more guilty of this kind of homology than the "assumptions of current sociobiological reasoning" often are.

Having begun with an attack, I'll end with a little reconciliation: Few problems are as interesting or as important as lethal conflict. Both Knauff's study of Gebusi homicide and this review of killing, etc., in apes and humans are packed with interesting—and potentially very important—information. I appreciate that.

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This is an astute and wide-ranging synthesis. A significant contribution is the emphasis placed on the evolutionary anomaly that one faces if one begins with the great apes and ends with modern humans, concentrating on what might be called *agonistic style*. The glaring discontinuity comes, of course, with egalitarian societies, that is, societies in which leadership is unassuming and hierarchy among adult males is weakly developed. The discontinuity is as follows: African great apes and human societies at the chiefdom level and higher exhibit pronounced male dominance hierarchies, while egalitarian societies exhibit the opposite (see Boehm 1982, 1984*b*). This well-known "egalitarian" type has come to include foraging societies but also many sedentary ones, among them segmentary societies with rather high population densities and warfare.

Knauf confronts anthropologists interested in social evolution and warfare with an absolutely critical distinction within this rather diffuse class, that between simple and complex foragers. In pondering the apparent evolutionary riddle of the contrast between the simple foragers who long typified human political organization and both African great-ape and centralized human societies, anthropologists must, I think, look much more closely at the leveling factors that make small-scale human societies "egalitarian." So far, causes of leveling among males have been found mostly in ecological factors or in the dynamics of social or economic systems (e.g., Fried 1967); to my knowledge only Lee (1979), Woodburn (1982), and I (Boehm 1982, 1984*a, b*) have argued that egalitarian society is a direct result of human intentions.

One way to consider the role of intentions in simple foraging and other egalitarian societies is to start with the genotype: I assume in a common ape-ancestor a significant disposition to form hierarchies, since this is present in African great apes and modern humans. One then asks what cultural behaviors might account for the absence of hierarchy in simple foragers, assuming that they too share that disposition. The answer would appear to be that humans deliberately create and carefully maintain "reverse dominance hierarchies" (Boehm 1984*b*, n.d.) whereby the potentially subordinate adult males—the rank and file—band together *assertively* to limit the dominance of more aggressive or otherwise outstanding individuals. I have surveyed a large number of egalitarian societies (simple foragers, complex foragers, and many others) from various cultural areas and found evidence of such behavior. The result is far from an absence of male rivalry or inequality, but there is a sharply negative response if someone behaves too assertively or tries to control other males. This syndrome relates to personal autonomy: males will not countenance being "bossed around" (e.g., Woodburn 1979). Among Knauf's simple foragers it also involves the eq-

uitable distribution of foodstuffs and, sometimes, women within a group that believes in cooperation and equality.

An evolutionary hypothesis would be that dominant egalitarian control of leaders arrived with the moral community (Boehm 1982), a socially manipulative group that is strongly (and often consensually) "judgmental." Such an argument has obvious relevance for coevolutionary theory. In effect, if a cultural behavior can suppress selected aspects of a marked behavioral disposition such as the tendency to form dominance hierarchies, without even physically eliminating individuals who inherit large doses of that disposition, then at the phenotypic level a force set in motion by genetic selection is being powerfully and radically—but not permanently—transformed by cultural selection; this is implemented through group decisions (see Boehm 1978). It is possible that this same reverse-dominance-hierarchy cultural behavior is also modifying the gene pool, since males who overstep sometimes are executed.

To explain the evolution of social behavior, we must choose wisely among extant models for prehistoric social life, all of which have been problematic. Knauf has facilitated a major stride in this direction. Once the best possible model is chosen, evolutionary "triangulation" can be improved. For example, judging from the behavior of the African great apes, it seems likely that the common ancestor exhibited a decisive and forceful triadic-intervention style of conflict management within the group (Boehm n.d., Goodall 1986; see also de Waal 1982). By contrast, in Knauf's simple nomadic foragers very weak egalitarian leadership combined with an absence of effective institutions to mediate conflict can result in higher rates of intragroup homicide compared with those inferable for chimpanzees. However, Knauf overemphasizes the fact that simple societies appear to take little interest in mediating conflicts. I think that a close reading of certain ethnographic accounts (e.g., von Fürer-Haimendorf 1967) would suggest that some serious attempts are made in this direction but that, since for a nomad to pull up stakes and move to another open group involves no very heavy investment loss, usually one protagonist pursues a strategy of avoidance rather than immediate reconciliation. In the more complex egalitarian societies, including clan-based territorial ones that stimulate male lethal aggressiveness by warrior socialization and training, *forceful* control of internal conflict by high-ranking males is still preempted by egalitarian behavior. But in many of these feuding societies (e.g., von Fürer-Haimendorf 1967, Boehm 1984*a*) institutionalized types of noncoercive conflict management can become quite effective, even in the absence of any really authoritative human agency.

Thus it would appear that when Knauf's prehistoric simple foraging nomads became settled, an already high group-internal homicide rate came under more immediate control. This took place as territorial behavior became more developed, groups became more bounded, and adjacent groups came to have more to fight about and therefore began to train warriors. When inevitably

the warriors quarreled among themselves and threatened to divide the group and make it vulnerable, people coped with this perceived threat. Their mode of intervention was not a strong, chimpanzee-gorilla style of leadership (even though we know from what happened later with kingdoms and states that the potential for that was still strong in the species) but the creation of cultural rules and institutions that regulated but realistically did not try to suppress entirely the homicidal self-expression of individuals.

A fascinating problem for future exploration is how the vigilantly egalitarian dominance behavior of followers described above was "disarmed" during the transition to kingdoms and states. State-formation theory will be incomplete until this important political element, involving both genotypic dispositions and purposive cultural selection, is taken directly into account.

Knauff has taken a very important first step in differentiating simple from complex foragers and has convinced me that the simple foraging society, with its significant political differences from other egalitarian societies, is the appropriate model for earlier prehistoric "triangulation." Another necessary ingredient of a more effective approach would be a move away from the overly mechanistic functional frameworks that have served anthropology rather well over the past century and a more aggressive search for documented instances in which the *deliberate* kind of "strategizing" shapes evolutionary outcomes (see Boehm 1978, Vayda 1989). I believe that one of the first such instances was the emergence of control of leaders by followers instead of vice versa. This was the beginning of Knauff's simple foraging society—surely, as he says, the longest-lasting social form invented by humans.

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As usual, Knauff's theories and speculations are clear, cogent, and stimulating. His argument that "culture" potentiates an evolutionary mechanism of group selection is attractive. His assertion that competitive male dominance hierarchies among people are analogous but not homologous to those found among other anthropoids is precise and, given his evidence, inarguable.

Native Australians constitute an exception that tests his characterizations of "simple human societies." I am completely ignorant of the prehistory or ethnography of the area. Still, along the path that the ancestors of native Australians probably took lies New Guinea, a huge island so extraordinarily rich (e.g., in carbohydrates from taro and sago) that native foragers using simple stone tools (Townsend 1969) routinely formed settled communities of considerable complexity (e.g., Ellen 1988; Townsend 1974, 1977, 1990; cf. Langub 1988). The influence of social evolutionary theory has obscured the fact that its founders saved a space, albeit secondary, for

"degeneration theory," the idea that some societies are in some ways less "advanced" than their ancestors in social evolutionary terms (e.g., Tylor 1958 [1871]:41–48). Foragers moving from a relatively rich into a relatively harsh habitat might change their foraging strategies faster than their ideologies, particularly those ideologies involved with religion, which is often subject to "cultural lag." Shifts in foraging strategy due to new circumstances are not rare cross-culturally (e.g., Headland 1988, 1990; Townsend 1990). Perhaps part of the complexity of native Australian culture grew out of a more complex form of social organization adapted to richer surroundings.

It is important to remember that, in talking of social evolution, Knauff is particularly interested in a supposed sequence of adaptations. His article would be stronger, as he indicates in a couple of places, if he had focussed more on culture as an adaptation and less on culture as a factitiously static stage in an implicitly unilinear scheme. The foregoing speculation about native Australians, whatever its worth, exemplifies a focus on adaptation rather than evolution. My concern with this matter stems from my belief that patterns similar to those Knauff attributes to simple human societies may develop as adaptations to a number of other environments, for example, slaving (Dentan n.d.a) or religious encavement (Dentan n.d.b). There are differences: "negative peace" rather than the "positive peace" that Knauff discusses tends to be salient among people who flee slavers (for this distinction, see Sponsel 1989:29–30; Stephenson 1990:5), and child rearing by enclaved religious communities tends to be harsh. But Knauff's supposed evolutionary sequence is difficult to demonstrate archeologically, and the emphasis on social evolution (1) obscures similarities in adaptation that might be enlightening, (2) could foster erroneous despair about the possibility of recreating the admirable qualities of "simple human societies," such as egalitarianism and love of peace (e.g., Denich 1987), and (3) can lead to the stereotyping of peoples as "harmless" or "fierce" on the basis of observations limited to particular times and places.

Knauff's admirable philosophical achievement in this article is to free Darwinism from the Social Darwinist scientism that has recently cloaked it (e.g., Daly and Wilson 1991). Since human egalitarianism and peaceability are social facts as real as human hierarchies and violence, any theory that purports to explain the latter should explain the former as well, not just dismiss them as epiphenomenal or "reaction formation" (cf. Robarchek 1991). A politically neutral Darwinism that accepts the fact of cultural adaptation should prove a powerful intellectual tool.

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Humans evolved in groups of about 25 + or so, although in very favorable situations considerably larger groups might have been possible. Notwithstanding the cultural

changes of the last 12,000 years, the optimal number of fellow humans with whom we can be really intimate has not changed. I am generally in agreement with Knauft's argument; unfortunately, our really good examples of simple foragers (!Kung, Shoshone, Eskimo, Australian Aborigines, et al.) are ecological oddities, but one works with the data one has!

As Knauft implies, the evolution of the interface between human sociality and the capacity for violence (including the reptilian-mammalian-primate baggage which we still carry) must be analytically separated from *what* humans fight about. Simple foragers (and all humans) contend over access to sexual partners, breaches of norms of reciprocity, and possibly some types of incorporeal property. Conflict over corporeal property, territory, and political office is very recent.

The term "violence," in both academic and common usage, can be a trap for the unwary. At least five meanings may be identified in English usage: (1) any agonistic conduct, (2) any agonistic conduct resulting in injury, (3) any conduct *intended* to cause injury, (4) in the classic Marxian sense, the use of tools as a means of social domination, and (5) culturally disapproved conduct, as when we describe disapproved police conduct as "violent" but not routine police activities (see Wolff 1971).

This last use of the term is particularly troublesome in the analysis of simple societies in that Westerners since the Renaissance have increasingly regarded *individual* violence as "irrational," leaving "rational" violence to the mysteries of the state. But in prestate societies, an opposition of "reason" to "violence" surely makes no sense. Humans can, and very often do, rationally use violence to achieve individual and group goals. Indeed, the rational use of violence in any simple face-to-face society more often than not involves *feigning* the running-amok "reptilian" conduct that Knauft describes (see Kiefer [1972] for one of many ethnographic examples). For most mammals and all higher primates, agonistic behavior can be playful: humans are certainly the most playful primates of all. But to feign agonistic conduct playfully presupposes that others recognize the "real thing" as a capacity in themselves.

Knauft argues—correctly, I think—that violence in simple human societies was generally dysfunctional for both the society and the individual: population densities were small, and "picking up one's marbles and leaving" was the efficient way of dealing with hostility. However, the capacity for "reptilian" violence, whether maladaptive, adaptive, or whatever, *did* in fact persist. I suspect that one of the reasons was precisely that the playful feigning of agonistic conduct makes such great social drama and, provided that it is subject to self-control, indeed contributes to social solidarity in the long run.

Self-control is absolutely crucial, and it presupposes a self. In saying that each human has a "self" I mean only what George Mead (1934) meant: that one can *act* toward oneself as if one were an other. The evolution of this capacity is critical to the cortical control of violence. Being able to act toward oneself (and imagination is an act) has at least two significant consequences for human sociality. First, it enables humans to project

long-range intentional self-interested strategies. Second, without it no "morality"—at least as we would recognize it—would be possible. Knauft rightly emphasizes that in simple societies there is a tension between the force of cultural norms and individual desire to break them. I would argue that this tension is intrinsic to the human condition as a self-conscious animal and is peculiar to simple foraging societies only in the sense that it evolved there. Mead (1934) stressed the importance of fully developed human language in the evolution of the capacity for self, but all recent studies of apes have shown that this is outdated. Some degree of "proto-self-control" and a high degree of ability to predict others' (and presumably one's own) intentions is deeply rooted in our primate past (Jolly 1985:400).

In my view, the relationship between the evolution of human violence and sociality is mediated by the gradual perfection of the capacity for self-control, which was highly adaptive in many ways. As Knauft implies, it is probable that, in the very long period between the emergence of (normative?) food sharing and 12,000 B.P. or so, most interpersonal violence (and feigning thereof) involved sexual conflict, and access to women may have been one important factor. Ambivalence over sexual self-interest and cooperative group life was plausibly one adaptive function of self-control, particularly if losing self-control did *not* win the woman and might easily lead to exile or death.

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Knauft's "typological" mode of presentation creates an apparent homogeneity that is not supported by the data. One receives the impression that most intragroup violence is related to "male sexual disputes over women," that "feuding or warfare does not appear pronounced," and that "strong emphasis is placed on cooperative sociality." Rather than draw his support from only a few examples, usually the !Kung, Mbuti, or Inuit, it would have been methodologically preferable for him to have utilized the subsample of 39 societies drawn from the *Atlas of World Cultures*—coding these societies for key variables such as brawling, homicide, capital punishment, feuding, and warfare.

I believe that the alleged similarity of simple human societies would disappear if Knauft made a genuine effort to look for differences. In my comment upon his previous article I pointed out (1987:485) that the frequencies of each form of violence vary from society to society and offered a theory to explain the variation (see also Otterbein 1988).

Variation also exists in the frequency of warfare. Knauft's 39-society subsample greatly overlaps a sample of hunter-gatherers utilized by Ember (1975, 1978). The similarity of selection criteria insures that many societies must appear in both samples. Ember obtained frequency-of-warfare ratings for many of the societies, in her sample. Using this sample and her codes in a

cross-cultural study relating dependence on hunting to warfare frequency (Otterbein 1989), I have found that the greater the dependence upon hunting, the greater the frequency of warfare ($r = +.45$, $p < .01$). I was able to perform this analysis because of the great variability in warfare frequency; in a sample of 31 societies, the number of societies for each point on the variable is 6, 4, 6, 4, 2, 2, 4, and 2.

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Visiting Mexico to explain the journal he was to launch the following year (CURRENT ANTHROPOLOGY), Sol Tax mentioned in 1959 while chatting with Ignacio Bernal that the paradise myth probably referred to vague memories of preagricultural times, before the appearance of war. The idea stayed with me. In 1968, with violence breaking out in France, Mexico, and elsewhere, I was in a Valley of Oaxaca Zapotec community whose people boasted of not having, in contrast with their neighbors, a local problem of interpersonal violence. Skeptical, I checked and later with the aid of others documented an astonishing difference. Homicide rates were high in most Oaxaca villages but almost incredibly low in some, though they lacked police, courts, or prisons (Paddock 1974, 1975, 1976a, b, 1979a, b, 1980). Evolution does not begin with the great apes. The antiviolent tendency we documented with statistics and observations in villages apparently like their violent neighbors might relate, then, to the near absence of violence in pre-primate species, even more ancestral than the violence among the great apes.

Among the several hundred references Knauff lists there is no citation of the journal *Aggressive Behavior*, organ of the International Society for Research on Aggression, though works by several members of the Society do appear. This might be because that journal tends to publish on extremes—laboratory animals (psychologists) and urban-industrial communities (sociologists, anthropologists)—while Knauff's area is intermediate.

Having personal experience only with Zapotec Indian villages in far southern Mexico, I am stimulated by the observations that Knauff makes about simple and middle-range societies, for traits of both classes are significant in these villages (which of course do not fit into either). In pre-Hispanic times they were much like "peasant" communities, and the Spanish conquest introduced some European ideas without changing their status as rural producers for urban consumers. However, Mexican independence and modernization have invalidated the "peasant" status even for many almost purely American Indian communities when they participate in urban life to the degree that Valley of Oaxaca villagers now do.

Our research showed nearly incredible differences in homicide rates between villages that are closely similar with respect to the commonly ascribed "causes" of violence such as alcohol, sexual access, boundary quarrels,

crowding, poverty, and political ambition. The crucial difference, we found, was local consensus on the desirability of living without interpersonal violence. While we did not locate the origin of the phenomenon, a recent case may help. A Oaxaca village far from the central valleys we studied once had one of the highest internal homicide rates in the world, but the women rebelled and banned alcohol, arms, and violence (Greenberg 1989:230–34; Paddock 1990). Our antiviolent villages do not forbid alcohol and in fact often use it to excess, but they have traditions of antiviolence that are thoroughly established, perhaps centuries old. (The term "antiviolent" was applied here because these communities are not totally successful in preventing interpersonal violence, hence "nonviolent" would be too strong.)

Ranking does exist in our antiviolent villages, but it is controlled and diffused. Official posts are assigned to all adult males by turns, though assignment of power to elders is separate and there is also unofficial ranking. Such villages are part of a larger society and are assigned low ranks within it, but they are also social units, communities with individual characters of which they are proud. More remote communities, and groupings of them, are nearly complete societies in themselves, almost lacking participation in state and national societies.

Hawaiian *ho'oponopono* (Shook 1985) also seems not to fit either of Knauff's classes or in some ways to fit both, though it shares some traits with Valley Zapotec villages practicing antiviolence. It is an effective device for conflict resolution but in a society marked by male ranking and, apparently, intercommunity violence as well as intracommunity antiviolence. (Interestingly, urban social workers are finding it effective among non-Hawaiians.)

The humanity of scientists is often ignored; Knauff is to be commended for finding ways to compensate for it. Born and socialized in large societies with high rates of external homicide (i.e., war), archeologists commonly attribute similar orientations to ancient societies while ignoring evidence of other sorts, on the apparent assumption that war making is an inescapable human trait. Shocked by personal experience in violent Oaxaca societies, ethnographers may simply deny the reality of Oaxaca antiviolence, abundantly documented though it is (Paddock 1988, 1990).

The vast majority of humanity now lives neither in simple nor in middle-range societies. Therefore it would be helpful to see a proposal for classifying the societies Knauff has prudently avoided, even though that will be difficult and controversial.

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This paper demonstrates what anthropology can do in the 1990s if the resources of its various subdisciplines

are brought to bear on the one problem that unites the field: human social evolution. In synthesizing findings of primatology, archeology, and ethnology, Knauft brings new respectability to general or philosophical anthropology—the only kind of anthropology that may yet save the field from its own centrifugal forces.

While I am sympathetic, then, with Knauft's general aims and admire the range of data he has marshalled to press his case, there seems to me another interpretation of those data that he does not adequately consider. His own view is that the distinctive social patterns of ethnographically known simple foragers demonstrate that human social evolution is "U-shaped," with great-ape societies ironically resembling groups of complex foragers and food producers more than they do simple foraging societies. While such a U-shaped trajectory is of course possible, the irony itself points to the alternative interpretation: simple foraging societies as known from the ethnographic record may not be representative of such societies in the Pleistocene and may in fact be radically different, precisely because they have adapted to marginal areas outside the main currents of human social evolution. Although Knauft notes that "highly decentralized" foragers are likely to be "underrepresented in the archeological record," he does not mention that they are also probably *overrepresented* in the *ethnographic* record compared with less marginal foragers who presumably evolved into or were assimilated by food producers. This familiar caveat about extant hunter-gatherers is perhaps best illustrated by Gellner's (1988:36) striking analogy:

Let us suppose that in the twenty-second century the world is fully industrialized, but that somewhere near Yasnaya Polyana, or in the English shires, a few communities of Tolstoyans or William Morris enthusiasts survive, firmly rejecting the values and practices of the surrounding world, and perpetuating the lives of muzhiks or of English medieval craftsmen, or what they fondly imagine to be such. How justified would a twenty-second-century anthropologist be in studying such communities, and on this basis reconstructing a general model of the agrarian world as it truly was?

If modern foragers are indeed "fringe groups from the Stone Age," perhaps the best we can do is try to reconstruct the central habitats of that age so that, by combining this information with what we know about modern foragers (and perhaps nonhuman primates as well), we can retrodict how typical Pleistocene foragers might have lived.

Knauft's own reasoning suggests a way to begin such a reconstruction. Following Foley (1989), he notes that "in the social organization of the common ancestor of apes and humans, a tension could plausibly have existed between chimpanzee-like patterns of male philopatry and selective pressures for more open, dispersed, and flexible alliances." With the evolution of *Homo* and the elaboration of cultural transmission, Knauft argues, the pattern of social organization "turned decisively away

from male philopatry and closed fraternal interest groupings and toward more open and more flexible social networks." Then, with intensified production and the establishment of "stable and valuable resource bases," human social organization *reverted*, in his view, to the chimpanzee-like pattern.

Now, there are two points to be made here. First, even if we accept simple foragers in the ethnographic record as models for those of the Pleistocene, the very fact that humans all over the world consistently shifted, with the transition to more intensive foraging and food production, from their open flexible groupings to the atavistic pattern of relatively closed male-bonded groups suggests that the tension between these two poles was not decisively resolved with the evolution of *Homo*. If tribal and chiefly societies all over the world spontaneously "reinvented" a pattern of social organization resembling that of chimpanzees, the most reasonable explanation may be that this pattern survived in the human social repertoire from the common ancestor of humans and African apes and was only dormant through the long period of simple foraging bands.

Second, this pattern may not have been dormant at all. Relatively closed fraternal interest groups are presumably formed by both chimpanzees and humans to defend concentrations of resources which generally do not exist in extant populations of simple foragers. In the human case, such concentrations are now artificially generated through food production, but in the Pleistocene they must have occurred naturally in at least some human habitats, just as they do in chimpanzee habitats. And if humans consistently jump at the opportunity to defend artificial concentrations of resources by forming fraternal interest groups, there seems little doubt that they would have done the same thing wherever natural concentrations occurred. The picture that emerges has the common ancestor of humans and African apes living in relatively closed, male-philopatric groups, then spreading out from central areas where resources were concentrated into marginal habitats where resources were dispersed. In these marginal areas, the open, flexible groupings characteristic of extant hunter-gatherers would have emerged, but in the central areas even simple foragers would have remained in relatively closed, male-philopatric communities. Eventually these would have been transformed smoothly into patrilocal tribal societies, with no intervening stage of flexible social organization. The U-shape of human social evolution proposed by Knauft would be an illusion created by casting an adaptation to extreme conditions as a global evolutionary stage.

While such a scenario deserves more attention than Knauft gives it, human residence patterns may be beside the point anyway if one's ultimate aim is to understand patterns of social relationships. In contrast to nonhuman primates, in which philopatry, consanguinity, and cooperation tend to coincide, humans display dispersal patterns that predict patterns of kinship and cooperation only weakly, if at all (Rodseth et al. 1991). In this sense, my colleagues and I *are* stressing "the distinctive open-

ness of human social networks," but this openness refers to patterns of social relationships independent of spatial proximity, making it conceptually distinct from the "open" residence patterns Knauf attributes to simple foragers.

Thus, leaving aside the issue of flexible versus patrilineal residence, we might ask with regard to Knauf's simple foragers whether men are permanently cut off from their close male kin in the way that most male primates are when they migrate to other groups. The answer, to my knowledge, is no. In fact, men usually maintain crucial alliances with their natal kin whether they reside with them or not. The fact that these alliances do not always constitute "fraternal interest groups" in the conventional sense is irrelevant, since such groups are conventionally defined in part by patrilocal residence. Whatever their residence patterns, it may be argued, humans are very generally if not universally "male-bonded." (Women of course also tend to maintain relationships with natal kin but are not "female-bonded" in that they seldom form alliances with each other for purposes of aggression against members of their own sex [Rodseth et al. 1991].) Even matrilocality, which disperses male kin at the level of the household or "neighborhood," tends to reassemble them at the level of the community or tribe, especially for purposes of long-distance warfare against unrelated groups (Rodseth et al. 1991). This is why we describe matrilocality as a case of "agnatic sprawl," with the whole network of intermarrying households often acting as one large "fraternal interest group"—not because brothers reside together, of course, but because the community or tribe as a whole constitutes a "power group of related males" (Otterbein and Otterbein 1965:1472).

Reply

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There is a great need for testable models of the relationship between cultural and biogenetic selection in specific periods of human evolution. My paper is but a rough initial effort in this direction, and even then it approaches human evolutionary theory through the topical "back door" of violence and sociality. I hope that further commentary on both my paper and those of Rodseth et al. (1991) and Manson and Wrangham (1991) will stimulate a richer consideration of human evolutionary theory as well as of the developmental trajectories of human violence and sociality per se.

Acknowledgment should be made of Boehm's independent prior assessment (1984:12) that "social and political hierarchy is strong particularly in the other terrestrial primates with which we like to compare ourselves, and it is strong with us, too, after we centralized our politics and economies to form states; however, it is

virtually absent in the critical transitional form of hunters or hunters and gatherers" and his further assessment (p. 13) that "culture acquires . . . force precisely at the point that a moral community is formed—a face-to-face community of individually self-conscious individuals who, through verbal symbolic communication, reach the point that they understand their common identity in terms of a common self-interest." As have I, Boehm has suggested the plausible association of this process with the development of elaborate protolanguage, cultural transmission, and rule-influenced behavior in human evolution as early as *H. erectus* (e.g., Boehm 1982:417). He has also given more attention than I to the parasitic selection (and even group selection) that might operate prior to the development of widespread cultural transmission. In his view, these patterns preadapt primate conflict interference for subsequent development into human patterns of culturally mediated conflict management (Boehm 1981).

Boehm is correct to criticize my paper for not giving sufficient attention to informal conflict mediation techniques in simple human societies (e.g., Briggs 1970; Marshall 1976; Turnbull 1961, 1982; see Knauf 1987a:376). The question of how these societies maintain "reverse dominance hierarchies" is correspondingly critical. Boehm's query goes well beyond the misplaced criticism of sociobiologists that since at least some inequalities of skill, leadership ability, and number of offspring exist in simple societies, these must function collectively to foster the reproductive success of dominant, aggressive leaders. Such inequities are both culturally and self-consciously minimized in these societies. Perhaps more important, they tend not to "line up" in a mutually supportive way: aggression, material aggrandizement, dominant leadership, and reproductive success do not coalesce as a Darwinian set. As Boehm suggests, it will be crucial to explore how various inequalities are culturally precluded from coalescing and under what conditions they begin to coalesce as more formalized and centralized leadership forms develop.

Boehm (cf. particularly 1981) alludes to the possibility of culturally mediated group selection; my own analysis places much greater emphasis on this factor. It seems to me that the high costs of altruistic behavior in both sexual restraint and conflict mediation render it unlikely to be selected for systematically in humans through parasitic selection or noncultural interdemic group selection alone (cf. Wilson 1980). That cultural transmission competes with biogenetic transmission in influencing behavior dovetails with Boehm's (1989) suggestion, implicit also in Kiefer's comment here, that human nature is better analyzed as a series of "universal dilemmas"—a distinctive set of *competing* behavioral impetuses—than as a series of single universal traits or motivational continuities. The primary competition is, in my view, between Darwinian propensities toward maximal biogenetic propagation and cultural propensities toward ideational transmission and dissemination.

Rodseth's suggestion that I am not sensitive enough to the contextual factors influencing current hunter-

gatherer variants is arguably more applicable to his own article than to mine: while developmental variation of social organization in the course of human evolution is foregrounded in my model, his ultimately collapses human variation into a single aggregate type. There have certainly been decisive changes in social organization, as in fertility and mortality, in the course of human evolution, viz., with the Neolithic and industrial revolutions. I suggest that the human revolution, with the emergence of symbolic culture in *Homo*, is at least as momentous as the advent of agriculture or industry in changing patterns of social organization. If assessed critically in the context of known historical trends, the ethnographic record of simple societies can help illuminate the selective parameters of this earlier revolution.

Human socioecology as it developed in the course of human evolution is in many ways consistent with that of simple societies documented in this century: both are characterized by large home ranges, dispersed, patchy resources, omnivory, and high mobility. The striking human trajectory from *H. erectus* until quite recently has been, as Rodseth would appear to concede, one of expansion into environments that were at the outset marginal. As Sahlins (1972) suggests, the prevailing economic tendency in simple societies is to minimize both labor and food surplus and to keep yields well below environmental limits. The low-intensity human ecology and the patterns of sociality and violence associated with simple societies are likely to have been quite common in human evolutionary history. Much has been made of archeological evidence of complex hunter-gatherer societies (particularly in Europe) in the late Paleolithic and Mesolithic, and a few resource-rich areas could have spawned complex hunter-gatherers yet earlier. When the evolution of *Homo* is considered as a whole and on a global scale, however, a nonintensive forager model is far more appropriate than one based on complex hunter-gatherers.

Rodseth's apparent recognition that male residence, bonding, and alliance in simple societies are frequently affinal and even fictive as well as patrilineal tends to dissolve his lingering sociobiological assumption that human males coalesce predominantly in *fraternal* interest groups, i.e., in "power groups of *related* males." As I have shown, the cross-cultural evidence strongly disconfirms this suggestion. In most simple societies the effective social group is a bilateral band and not a dispersed group of closely related agnates.

Betzig's comments contains several serious misunderstandings and echo the kind of unsophisticated sociobiology so effectively critiqued by Kitcher (1985). Most curious is her opening claim that my article is predicated on showing that "culture is keeping Gebusi from behaving adaptively" when the word "Gebusi" never even appears in it. I do not suggest that culture in simple societies is generally maladaptive or that "culture triumphs over nature." I stress that culture is group-adaptive, that the tension between cultural and biogenetic selection is never resolved, and that biogenetic propensities for fitness maximization continue to be

acted out. At the same time I argue that these propensities are crosscut by symbolically externalized and psychologically internalized cultural rules.¹ By failing to give sufficient attention to this dimension of my work, Betzig reads my suggestions about middle-range societies as an admission that polygyny is almost universal among their leaders and that dominance and violence are almost invariably related to reproductive success. These are claims I do not make. Despite the increased incidence of polygyny as a leadership prerogative in New World middle-range societies, a majority of these societies (31/51; 61%) still lack this prerogative (Feinman and Neitzel 1984:58–59). Aggression and reproductive success are not invariably associated in these societies (see, e.g., Moore 1990), and any such association as exists may represent sociocultural correlation rather than sociobiological causation. Finally, that Betzig is able to cite a few cases of polygyny in simple societies does not contravene the empirical trend to the contrary: "Nimkoff and Middleton (1960) demonstrated from HRAF data long ago that there is a highly significant correlation between type of family system and subsistence pattern; the independent, or monogamous, family is the most common in hunting and gathering cultures" (Kinzey 1987:111).²

The inappropriateness of asserting homogeneity for human societies as a whole and then drawing connections between aggregate primate patterns is only increased by the variations among great apes. A male-coalitional model of violence does not fit bonobos, orangutans, and gorillas, being characteristic primarily of chimpanzees. The persistence of the notion of fraternal-interest-group violence in human evolution may reflect the disproportionate attention once given to models of baboon dominance and aggression as a prototype for human violence. Strum and Mitchell (1987) have pointed to the abundant counterevidence about baboon behavior and social organization that was available even in the 1960s.

Recent considerations of human and ape sexual morphology (e.g., Nadler and Phoenix 1991) suggest that

1. It is important to realize that Darwin (1981 [1871]) also suggested that collective moral traits, such as sympathy, give human societies an important adaptive advantage over groups composed entirely of self-interested individuals. The possibility of group-level adaptation raised by Darwin himself (see especially 1981 [1871]:72, 98–104, 164–66) has been curiously neglected by neo-Darwinians.

2. Betzig's interpretation of Ache hunting and reproductive success may also be slanted. Kaplan and Hill (1985:133) found no significant difference in the number of certain or estimated total children born to good versus poor hunters; they found a difference only in the number of illegitimate or "possible" children. I have been informed that Ache believe multiple male inseminators to be co-conceivers of a single illegitimate child. In light of this, the pressure to designate only one of these persons as "the father" to satisfy the etic perspective of the ethnographic investigator could introduce significant bias. As Kaplan and Hill themselves point out, the documented greater survivorship of children of good hunters may be a product of genetically mediated physical robusticity that increases both men's hunting skill and the birth weight and survivorship of their children.

humans had neither a polygynous mating system similar to that of gorillas nor a multimale mating system similar to that of chimpanzees. Given the comments of Abler concerning my supposed collapsing of human and ape "polygyny," I reemphasize that the formal similarity between some dimensions of ape and middle-range human societies is an *analogy* only. The point is that what appear to some behavioral ecologists and sociobiologists to be cross-species similarities are in crucial ways quite different, and this fact is highlighted by the contrasting simple-society patterns. The evolutionary trajectory of violence that I propose does not suggest that patterns of leadership and mating in middle-range societies can be explained in any simple way by sociobiological principles, and indeed it argues against that notion.

The cogent comments of Abler, Dentan, Paddock, and Kiefer lead me to reemphasize that the enormous variation in middle-range societies is collapsed here only for the sake of broader comparison. Post-state development is outside my purview, which is dauntingly broad as it is (cf. Paddock, Abler). I have confronted variation among middle-range societies in the Melanesian context (e.g., Knauff 1985:339–48; 1989b, 1990c) and with respect to warfare (1990b). My awareness of this ethnographic complexity is one reason I make little attempt to differentiate sociodevelopmental patterns within this category. Comparative patterns of socioeconomic and political variation in small-scale sedentary societies are well addressed by Feinman and Neitzel (1984) and Upham (1990a), and systematic studies of prestate warfare have been made by Otterbein (1985) and Ross (1985, 1986). I have no argument at all with Abler's and Paddock's assessments that relatively nonviolent middle-range societies exist and that matriliney may be present and fraternal interest groups absent. My point is simply that middle-range societies *in the aggregate* exhibit a much greater propensity toward fraternal interest grouping, ethnocentrism, and collective armed conflict than simpler ones.

The purpose of my broader comparison was (a) to integrate data from diverse fields into a conceptual framework for the evolutionary study of human violence and sociality, (b) to counter evolutionary and biobehavioral models that uncritically project nonhuman primate tendencies onto humans, and (c) to suggest alternative and more sophisticated models that consider cultural as well as biosocial dimensions of human evolution. Evolutionary typologies are by their nature Popperian in function, serving as a lightning rod for counterexamples and refutation. An analysis on a broad scale elicits counterexamples at a more detailed level.

One of the drawbacks of evolutionary typologies such as mine is their neglect of complex evolutionary countercurrents, including devolution. I admit that a number of sedentary societies may exhibit egalitarian forms of social organization, particularly under conditions of external oppression (Abler, Dentan). This point has been made particularly forcefully by Jayawardena (1963, 1968; see Bern 1987). My argument encompasses this development not in evolutionary terms but in structural ones:

whatever the socioecological or historical pattern of their development, simple societies are likely to evidence a relative lack of fraternal interest groups, warfare, blood feuds, and raiding. Conversely, hunter-gatherers exhibiting significant male political-status differentiation, such as selected Australian Aborigine groups, may be expected to have a greater incidence of collective violence and warfare than more decentralized societies inhabiting similar environments. Thus developmental correspondences are not uniform in each case but are evident in aggregate evolutionary trends: most societies of the period between 1,500,000 B.P. and 13,000 B.P. are likely to have been closer to the "simple" end of the continuum. By contrast, most sedentary societies are, through both endogenous and exogenous processes, likely to be closer to the "complex" end. Isolated cases to the contrary do not invalidate the model; what *would* falsify it is many cases of politically decentralized simple societies with a high incidence of warfare, blood feuds, and raiding.

Abler's suggestion that warfare in middle-range societies can in large part be accounted for as a function of Western encroachment deserves particular consideration. This argument (which has been strongly made as well by Blick [1988], Ferguson [1990], and Ferguson and Whitehead [n.d.]) is the first step toward a more historically sensitive understanding of the relationship between colonial and precolonial patterns of violence and warfare. There is no question but that Western encroachment has transformed, redirected, and in some cases intensified indigenous conflict; the introduction of guns and the coopting of indigenous forces in the service of colonial military objectives are well documented from numerous parts of the world. It is erroneous, however, to assume that intense collective violence was absent aboriginally or that the homicides involved in indigenous warfare were demographically insignificant. Precolonial warfare among middle-range societies was, as I have pointed out, strongly evident in native North America, South America, Africa, and Melanesia. The Melanesian cases are particularly dramatic and well documented (see review in Knauff 1990b and also Shankman 1991), and archeological evidence suggests similar patterns in the New World (e.g., Haas 1990).

Otterbein's finding that extreme dependence on hunting may be associated with warfare is interesting and, in terms of my analysis, expectable. A large proportion of the societies in Ember's (1978) hunter-gatherer sample, upon which Otterbein's analysis is based, are equestrian or fishing societies, both of which may be predicted to have greater frequencies of warfare than simple societies. Equestrianism in particular is often linked with strong dependence on hunting. Ember's sample is heavily weighted toward North America, where the Western introduction of the horse and of fur trading had a profound impact; this geographic pattern may itself be significant in explaining the range of variation that Otterbein finds. Finally, as I have noted with respect to intensive big-game hunters of prehistoric periglacial Eurasia, socioecological factors that increase the con-

centration of large-scale resources and make them easily exploitable with available technology can be expected to potentiate sociopolitical complexity. When such factors are not pronounced—and I suggest that they have not been for most of human evolution—the simple-society pattern is likely to be particularly applicable.

I agree with Otterbein that a cross-cultural study of the 39-society sample I employed would be an important complement to my argument. The nature of state-society influences, the historical context, and the types of bias must, however, be very carefully weighed in each individual case; the data cannot simply be taken at face value. Moreover, the constellation of factors that is most useful for evolutionary projection must be carefully delineated; if one is to avoid the charge that observed simple societies are not representative of the past, the similarities and differences between present and past societies on key socioeconomic, ecological, and even anatomical factors must be assessed. In contrast to many past approaches, my perspective emphasizes the evolutionary importance of cultural transmission and group selection, suggesting that we cannot adequately understand social development since the emergence of *Homo* without taking this dynamic into account.

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